APPENDIX: TECHNICAL SUPPORT DOCUMENT: Yuma Natural Events Action Plan

January 2004

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1999 AND 2016 EMISSION ESTIMATES FOR THE YUMA, ARIZONA PM_{10} NONATTAINMENT AREA MAINTENANCE PLAN

FINAL REPORT

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June 2003

Contract No. 98-0159
Pechan Rpt. No. 03.06.004/9412.001 (Rev.)

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ACRONYMS AND ABBREVIATIONS

ADEQ	Arizona Department of Environmental Quality
ARB	Air Resources Board
AZMET	Yuma Mesa Meteorological Station
CTIC	Conservation Tillage Information Center
DEQ	Department of Environmental Quality
EF	emission factor
EGAS	Economic Growth Analysis System
EPA	U.S. Environmental Protection Agency
FOFEM	First Order Fire Effects Model
GIS	Geographic Information System
lbs	pounds
LTO	landing and takeoff
mph	miles per hour
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
Pechan	E.H. Pechan & Associates, Inc.
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
REMI	Regional Economics Model, Inc.
SCS	Arizona Soil Conservation Service
tpy	tons per year
VMT	vehicle miles traveled
YMPO	Yuma Metropolitan Planning Organization

The Yuma, Arizona area was designated nonattainment for particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}) on November 15, 1990 by operation of law, but has not violated the National Ambient Air Quality Standard (NAAQS) since 1991. Arizona Department of Environmental Quality (ADEQ) has initiated a process to prepare a maintenance plan that requests redesignation to attainment, and describes how the area will maintain that status for the next ten years. In preparing this plan, ADEQ hired E.H. Pechan & Associates, Inc. (Pechan) to develop estimates of PM_{10} emissions for the area. This report is a technical support document that describes the methods used to estimate 1999 and 2016 PM_{10} emissions for the Yuma area. The study area is defined to be the Yuma PM_{10} Nonattainment Area, as designated by the U.S. Environmental Protection Agency (EPA).

EPA produces a National Emissions Inventory (NEI) every three years for counties in the United States. The most recent NEI completed for Yuma County at the time ADEQ began this study was in 1999. Consequently, the base year for this study is 1999. The projection year (2016) was selected to meet the EPA requirement that there be a maintenance plan demonstrating that the PM_{10} NAAQS will still be met 10 years after the area is redesignated as an attainment area by EPA.

The starting point for the 1999 inventory preparation was Version 1.0 of EPA's NEI, which contains PM_{10} emission estimates for Yuma County. Pechan, with input from ADEQ and the Yuma area stakeholders, identified the emission source categories for which there was limited confidence in the NEI estimates or the NEI did not contain estimates for the category.

This report describes the local data and emission estimation methods used to develop 1999 and 2016 PM_{10} emission estimates for Yuma. Emission estimates for any PM_{10} source categories not explicitly described in this report are taken from the 1999 NEI (Version 1.0). For most source categories, this report describes emission estimates only for the Yuma County portion of the Yuma Study Area (which includes portions of Imperial County, California and Baja California Norte, Mexico). Emission estimates for the rest of the Yuma Study Area for use in air quality modeling are described in separate documentation submitted to ADEQ (Pechan, 2003).

A. AGRICULTURAL AND PRESCRIBED BURNING

Estimates of PM_{10} emissions from agricultural burning were calculated using the following equation:

$$E = a * f * e$$

where :

E = PM_{10} emissions (tons/year);
a = acres burned per year;
f = fuel loading factor (tons/acre);
e = emission factor (pounds [lbs] PM_{10}/ton of material burned).

Estimates of the average annual acreage burned (from May 1998 to present) in Yuma County for the following crops were derived from information submitted by the Yuma Rural/Metro Fire Department: bermuda grass, wheat stubble, citrus, jojoba, artichoke, and sugar cane. However, estimates for burning of jojoba, artichoke, and sugar cane were excluded from emissions in the nonattainment area because burning of these crops occurs outside of the nonattainment area. Some burning of wheat stubble occurs outside the nonattainment area; therefore, the wheat stubble acreage burned (4,851.5) was multiplied by the ratio of nonattainment acreage (28,783 acres) to total county acreage (38,783 acres) to obtain the nonattainment area wheat stubble acreage burned.

The majority of burned acres are comprised of citrus and wheat stubble. Therefore, estimates were focused on developing appropriate emission factors for these two crops. The emission factor (EF) and fuel loading for wheat stubble were taken from an August 2000 California Air Resources Board (ARB) memo on agricultural burning emission factors (Shimp, 2000). This memo contains recommendations for emission factors and fuel loading factors for the burning of various agricultural residues. For some residues, newer test data than those used to develop the AP-42 emission factors were used to develop revised emission factors (for the remaining residues, AP-42 factors were used). Fuel loading factors in the California ARB memo are still taken primarily from AP-42. The citrus (orange, lemon) emission factor was taken from Section 2.5 of AP-42 (Table 2.5-5). The average emission factor and fuel loading from the California ARB memo were used for bermuda grass.

The Yuma Rural/Metro Fire Department was contacted to determine the months in which burning occurs, so that the annual emissions can be temporally allocated. Bermuda grass and wheat were reported to be burned in June, and all other activity is assumed to occur throughout the year (Foster, 2002). Emission estimates and supporting data for 1999 are summarized in Table 1a. Projected activity data and emissions for 2013 are provided in Table 1b. Information for 2013 activity levels was obtained from the Yuma stakeholders and documented in a May 2002 memorandum (Wrona, 2002). For the purposes of estimating 2016 emissions, the same 2013 activity levels are assumed. Also for the 2016 projected emission estimates, Bureau of Land Management 2013 prescribed burning activity levels (100 acres) are assumed to be appropriate for 2016. For these prescribed burns, fuel loading and emission factor information was taken from recent EPA guidance for wildland fires

(EC/R, 2002). This information corresponds to default values used in the First Order Fire Effects Model (FOFEM) for grasslands and shrubs.

B. AGRICULTURAL TILLING

PM emissions from agricultural tilling were calculated using the equation below (EPA, 2001a):

$$E = c * k * s^{0.6} * p * a$$

where:

E = PM emissions (lbs/year);
c = constant of 4.8 lbs/acre-pass;
k = dimensionless particle size multiplier (PM_{10} = 0.21);
s = silt content of soil (mass fraction of particles smaller than 75 µm diameter found in soil to a depth of 10 centimeters) (percentage);
p = number of passes/year;
a = number of acres.

Table 1a
1999 Yuma County Nonattainment Area PM_{10} Emissions from Agricultural Burning

Crop	Acres[1]	Fuel Loading (ton/acre)	Emission Factor (lbs PM_{10}/ton)	Emissions (tons per year [tpy])	Comments
Bermuda Grass	202	2.0	15.9	3.2	EF and Fuel Loading Source - ARB "Grasslands": Average of Field Crops (Shimp, 2000).
Wheat	3,601	1.9	10.6	36.3	EF and Fuel Loading Source - Shimp (2000); Nonattainment area acreage estimated as total burned acreage (4,851.5) x ratio of nonattainment area acreage (28,783) to county acreage (38,783).
Citrus	415	1.0	5.9	1.2	EF and Fuel Loading Source - AP-42; no correction made to acreage estimate; according to Farm Service Agency, most of citrus is in the nonattainment area.
Jojoba[2]	0	2.0	15.9	0	EF and Fuel Loading Source - Shimp (2000): Average of Field Crops.
Artichoke[2]	0	2.0	15.9	0	EF and Fuel Loading Source - Shimp (2000): Average of Field Crops.
Sugar Cane[2]	0	2.0	15.9	0	EF and Fuel Loading Source - Shimp (2000): Average of Field Crops.
BLM Prescribed Burns	0	0.3	25.3	0	No activity in 1999. EF and Fuel Loading Source - EC/R (2002).
Totals	**4,218**			**40.7**	

NOTE: [1]Acreage is annual average from May 1998 to present: Data from Rural/Metro Fire Department. [2] All burn activity occurs outside of the non-attainment area.

Table 1b
Projected 2016 Agricultural Burning PM_{10} Emissions

Crop	Fuel Loading (ton/acre)	EF (lbs PM_{10}/ton)	Acres*	Emissions (PM_{10} tpy)
Bermuda Grass	2.0	15.9	200	3.2
Wheat	1.9	10.6	3,000	30.2
Citrus	1.0	5.9	100	0.3
Jojoba	2.0	15.9	0	0
Artichoke	2.0	15.9	0	0
Sugar Cane	2.0	15.9	0	0
BLM Prescribed Burns	0.3	25.3	100	0.4
Totals			**3,400**	**34.1**

NOTE: *Acres burned estimates for 2013 were provided by the Rural/Metro Fire Department. 2013 activity levels are assumed to be representative of 2016 activity levels.

The surface soil silt content (83 percent) was estimated from the Yuma-Wellton Soil Survey from the Arizona Soil Conservation Service (SCS, 1980). The typical range of silt content on Yuma County crop lands was 75-90 percent. Estimates of the number of passes for all crops, except cotton, were obtained from the University of Arizona Cooperative Extension (Zerkoune, 2002). The number of passes for cotton was estimated based on Conservation Tillage Information Center (CTIC) conservation use estimates. The 1999 crop acreage, for all crops except wheat, was estimated based on data from the 1997 Census of Agriculture and information provided by the University of Arizona Cooperative Extension. Wheat acreage was provided by the Farm Service Agency. A summary of this information is provided in Table 2a.

Table 2a
1999 and 2016 Yuma County Agricultural Tilling PM_{10} Emission Estimates

Crop	Acres	Passes	Emissions (tpy)	Months	Comments
Cotton	27,972	5	999.0	March	Number of passes estimated based on CTIC estimate.
Barley	2,313	2	33.0	Dec-Jan	
Hay	9,000	3	192.9	Oct-Nov	University of Arizona Cooperative Extension office - tilling done once every 5 years - total acreage of 45,000 divided by 5 to get an annual average.
Wheat	28,800	2	411.4	Dec-Mar	Acreage from Farm Service Agency.
Vegetables	86,329	3	1,849.9	Aug-Dec	
Corn	4,000	3	85.7	Jan-Feb	
Totals	**158,414**		**3,572.0**		Same acreage estimated for 2013 (Wrona, 2002).

The months in which tilling occurs for each crop were provided by University of Arizona Cooperative Extension (Zerkoune, 2002) and the Yuma County Farm Bureau (Allen, 2002). This information can be used to temporally allocate the emissions. Acreage estimates, number of passes, and the typical months when tilling is performed for each major crop type were reviewed with a representative of the Farm Services Agency (Grissom, 2002). The total number of acres is higher than the total estimated 1999 crop acreage for Yuma County (126,000), since the effects of double-cropping are taken into account.

For 2013, stakeholders estimated that there would be similar activity (i.e., acreage) for all of the crops listed in Table 2a above (Wrona, 2002). The 2016 activity levels are assumed to be the same as estimated for 2013. Hence, agricultural tilling emissions are not expected to change significantly between 1999 and 2016.

In addition to tilling, cultivation and harvesting operations also produce PM_{10} emissions. Emissions data for cultivation and harvesting are limited. Pechan did identify some information on cotton and grain harvesting from AP-42 and California

ARB's area source methods. These data were used to develop emission estimates for those two crops, as shown in Table 2b below. Since the activity does not change between 1999 and 2016, the emission estimates are the same for these two years.

Table 2b
1999 and 2016 Agricultural Cultivation and Harvesting Emissions

Crop	Acres	EF (lbs/acre)	PM_{10} Emissions (tpy)	Months	Comments
Cotton	27,972	1.12	15.6	Sep-Jan	Harvesting EF from California ARB Area Source Methods Section 7.5
Barley	2,313	0.00	0.000		No EF available.
Hay	9,000	0.00	0.000		No EF available.
Wheat	28,800	0.00262	0.038	May-Jul	EF for $PM_{7.0}$ from AP-42 Section 9.3.2 for harvesting/truck loading/field transport.
Vegetables	86,329	0.00	0.000		No EF available.
Corn	4,000	0.00	0.000		No EF available.
Totals	**158,414**		**15.7**		

For cotton harvesting, emission factors vary by almost 2 orders of magnitude between AP-42 and California ARB's area source method (0.041 lbs/acre in AP-42 versus 1.12 lbs/acre in California ARB's method; California ARB, 1997). Since the California ARB EF is based on 1995 test data (compared to 1977 data for AP-42), it was selected for use in the Yuma PM_{10} emission estimates. The AP-42 data were also provided as $PM_{7.0}$, instead of PM_{10}.

For wheat harvesting, the AP-42 $PM_{7.0}$ emission factor was used for estimating PM_{10} emissions for Yuma County.

C. WIND-BLOWN DUST

Wind-blown PM_{10} emissions were calculated for the following land use categories: alluvial plain and channels, agricultural crop lands, agricultural unpaved roads, native desert, urban disturbed areas, and miscellaneous disturbed areas (e.g., construction areas outside of the City of Yuma). Emissions for the Imperial sand dunes were also assessed. Recent test data from sand dunes near Owens Lake, California indicates that significant emissions are only likely to occur when the threshold wind speed of about 35 miles per hour (mph) is reached (Nickling and Brown, 2001). No winds exceeding 30 mph were recorded by the Yuma Valley meteorological station in 1999. Hence, 1999 emissions for sand dunes were assumed to be negligible.

For agricultural lands, it was assumed that PM_{10} emissions are negligible during seasons when crops are present. Hence, emissions were only estimated during seasons when agricultural tilling occurs (estimates of vacant land by season are provided below).

Emissions from a particular land use category are calculated using the following equation:

$$E = a*f_1*w_1 + a*f_2*w_2+a*f_3*w_3$$

where:

$E = PM_{10}$ emissions (tons/year);

a = number of acres for the particular land use type;

f_1= the wind speed-specific emission factor for the land use type (ton/acre-hour); and

w_1 = the number of hours of wind in range 1.

Emission factors were taken from a recent University of Nevada, Las Vegas wind tunnel testing program in Clark County, Nevada (James et al., 2000). For different land use types (disturbed vacant lands, native desert, and stabilized vacant land), wind speed-specific emission factors were provided. Table 3 shows the assignment of these emission factors to the land use categories in the Yuma Study Area. The wind speed ranges are 15-19.9 miles per hour (mph), 20-24.9 mph, and 25-29.9 mph. Hence, the threshold wind speeds found in the Las Vegas testing are consistent with the 15 mph threshold found in the Phoenix Microscale Study (Sedlacek, 1999). The emission factors are provided in Table 3 below.

Table 3
Emission Factors for Windblown Dust

Emission Factor Types	PM_{10} EF (ton/acre/hour) by Wind Speed (mph)		
	15 - 19.9	20 - 24.9	25 - 29.9
Disturbed Vacant Land	0.00495	0.00521	0.0064
Native Desert	0	0	0.00257
Stabilized Land	0.00042	0.00034	0.00019

For agricultural fields with vegetation, it was assumed that there were no emissions. Seasonal emissions were calculated for each land use category. Annual emissions were calculated by summing across all land use categories and all seasons. Because the number of acres of vacant agricultural land varies by season, the total acreage of agricultural land was multiplied by the following percentages, based on months for agricultural tilling: Fall = 35 percent; Winter = 40 percent; Spring = 10 percent; Summer = 10 percent. No refinement of these estimates from stakeholders was received by Pechan.

Table 4 provides Yuma Study Area acreage estimates for the land uses of interest (Sedlacek, 2002), as well as the emission factor types that were used to estimate PM_{10} emissions. ADEQ developed acreage estimates for the various types of land use with input from stakeholders. Hence, emission estimates were developed for the entire Yuma Study Area, not just Yuma County. Vacant agricultural acreage by season was assumed to be the same in the Imperial County and Mexico portions of the Study Area. For unpaved agricultural roads, ADEQ sampled several areas throughout the Study

Area from satellite imagery to derive a factor (0.0815) to estimate the portion of agricultural land that was unpaved roads versus crop land.

A specific land use category for Urban Disturbed Areas (Code 295) was created to estimate emissions within the urbanized portions of the City of Yuma. This specific category allowed for more accurate characterization of the reductions in emissions associated with the 2013 reduction in disturbed area acres within the City of Yuma. This same 2013 reduction in disturbed area was assumed to be representative of 2016.

Table 4
1999 Yuma Study Area Acreage Estimates by Land Use Category and Emission Factor Type

Land Use Category	Land Use Code	Acres	Emission Factor Type
Alluvial Plain and Channels	440	141,227	Stabilized Land
Native Desert	390	74,252	Native Desert
Vacant Agricultural Fields	260	180,825	Disturbed Vacant
Unpaved Ag Roads	260	16,798	Disturbed Vacant
Urban Disturbed Areas	295	4,125	Disturbed Vacant
Miscellaneous Disturbed Areas	290	25,770	Disturbed Vacant

The number of hours of wind in each wind speed range was determined using 1999 average hourly wind speed data from the Yuma Valley AZMET station. Previous analyses by ADEQ had shown that, of the three stations in and around Yuma, this station had the highest number of hours above the 15 mph threshold. All days with measurable precipitation were removed from the data, since rain dramatically reduces the amount of wind-blown dust. To estimate the number of hours in each wind speed range, the number of *wind events* was also determined. Consecutive hours of wind over the threshold value of 15 mph were considered one *wind event*. A summary of the wind data used for estimating 1999 emissions is provided in Table 5.

Table 5
1999 Wind Speed Data for Yuma County

Season	No. of Wind Events*	Disturbed Land			Native & Stabilized Land		
		No. Hours (15-19.9 mph)	No. Hours (20-24.9 mph)	No. Hours (25-29.9 mph)	No. Hours (15-19.9 mph)	No. Hours (20-24.9 mph)	No. Hours (25-29.9 mph)
Fall	8	46	25	2	7	1	0
Winter	16	80	12	1	14	2	0
Spring	13	68	9	0	13	0	0
Summer	6	16	4	0	6	0	0

NOTE: *Wind events are used with native and stabilized land categories; the sum of hours for all wind speed ranges equal the number of wind events.

For native and stabilized lands, emissions are calculated using the number of wind events. This method is based on the assumption that after a short period of high winds on native and stabilized lands, most of the dust capable of being entrained by the wind has already been removed (i.e., the limited reservoir theory). The number of wind events is equal to the total number of hours above each of the wind speed thresholds, as shown in Table 5. Hence, emissions are assumed to occur only during the first hour of each wind event. For disturbed land, it is assumed that there is an unlimited reservoir of suspendable material. Therefore, the total number of hours of wind in each wind speed range was used in calculating emissions for disturbed land. In addition to the data shown in Table 5, there were several hours in the Fall and Winter of 1999 that exceeded the 25 mph threshold for native desert (these hours were part of the same wind events shown in Table 5). These hourly exceedances were used to estimate emissions for natural desert areas in 1999. Emission estimates are provided in Table 6a.

Table 6a
1999 Yuma Study Area PM_{10} Emission Estimates for Windblown Dust

Land Use Category	Acres	Emissions by Season (tons)				Total Annual (PM_{10} tons)
		Fall	Winter	Spring	Summer	
Alluvial Plain and Channels	141,227	463	926	771	356	2,517
Native Desert	74,252	191	191	0	0	382
Vacant Agricultural Fields	180,825	23,464	33,628	6,934	1,809	65,835
Unpaved Agricultural Roads	16,798	6,228	7,810	6,442	1,680	22,160
Urban Disturbed Areas	4,125	1,529	1,918	1,582	413	5,442
Miscellaneous Disturbed Areas	25,770	9,554	11,981	9,883	2,578	33,996
Totals		**41,430**	**56,453**	**25,612**	**6,836**	**130,331**

Emission estimates for 2016 are provided in Table 6b. It was assumed that the winds in 2016 would be similar to those observed in 1999. The only significant change in the activity data (acreage estimates) between 1999 and 2016 was the reduction of urban disturbed acreage; hence, the emission estimates for the entire Study Area are very similar. A small amount of agricultural land is lost to urban development in 2016.

Table 6b
2016 Yuma Study Area PM_{10} Emission Estimates for Windblown Dust

Land Use Category	Acres	Emissions by Season (tons)				Total Annual (PM_{10} tons)
		Fall	Winter	Spring	Summer	
Alluvial Plain and Channels	141,227	463	926	771	356	2,517
Native Desert	74,252	191	191	0	0	382
Vacant Agricultural Fields	179,048	23,234	33,297	6,866	1,791	65,188
Unpaved Agricultural Roads	16,633	6,167	7,733	6,379	1,664	21,942
Urban Disturbed Areas	2,290	849	1,065	878	229	3,021
Miscellaneous Disturbed Areas	25,770	9,554	11,981	9,883	2,578	33,996
Totals		**40,458**	**55,193**	**24,777**	**6,618**	**127,046**

D. UNPAVED ROADS - RE-ENTRAINED DUST

The most recent suggested revision of the AP-42 section for unpaved roads (13.2.2 Unpaved Roads) contains two new emission factor equations, one for industrial unpaved roads and one for publicly accessible unpaved roads (Muleski, 2001). The equation for publicly accessible unpaved roads was believed to be more representative of the Yuma Nonattainment Area; therefore, the emission factor was calculated using the following equation:

$$E = \frac{k(s/12)^{0.97}(S/30)^{0.46}}{(M/0.5)^{0.23}}$$

where:

E = size specific emission factor (lbs/vehicle miles traveled [VMT]);
k = 1.8
s = surface material silt content (%);
S = mean vehicle speed (mph); and
M = surface material moisture content (percentage).

A silt material silt content of 7.5 percent was determined from a soil sample taken from a dirt road in Yuma County (Catlin, 2002). A surface material moisture content representative of Arizona (1 percent) was used. The average vehicle speed was assumed to be 10 mph, based on tractor travel on unpaved roads in the Yuma area (Lima & Associates, 2000). *It should be noted that the above equation has been modified slightly*

in EPA's publicized draft version of the documentation of this equation. Primarily, the exponents have been rounded to 1 decimal place in the EPA version.

VMT data and the mean vehicle speed were obtained from the PM_{10} emissions analysis conducted as part of the Yuma Metropolitan Planning Organization (YMPO) Model and Air Quality Conformity Analysis project. The report indicates that the 1999 unpaved road daily VMT, calculated using TransCAD GIS-based modeling software, is 98,864 miles (Lima & Associates, 2000). The projected daily unpaved road VMT for 2016 is 64,240 miles. This value was estimated by calculating the annual growth rate between 2013 and 2025 unpaved road VMT projections (Lima & Associates, 2002). This annual growth rate of 6.1 percent per year was then used to estimate three additional years of growth from 2013.

Unpaved road reentrained dust emissions were corrected for the effects of precipitation, as proposed in the suggested revisions to AP-42. Corrected monthly emission factors were calculated using the following equation:

$$E_{corr} = E\left(\frac{N - p}{N}\right)$$

where:

E_{corr} = monthly emission factor corrected for precipitation effects;
E = the uncorrected emission factor;
N = number of days in the month; and
p = number of days in the month with > 0.01 inches of rain.

Precipitation data from 1999 was obtained from the Yuma Mesa Meteorological Station (AZMET, 1999). The number of days with greater than 0.01 inches of rain for each month in 1999 is shown in Table 7. The same precipitation data was used for the 2016 calculations. Table 8 shows the monthly PM_{10} emission factors and resulting PM_{10} emission estimates for 1999 and 2016.

Table 7
Number of Days with >0.01 in. of Rain at Yuma Mesa Meteorological Station in 1999

Month	No. of Days
January	0
February	2
March	0
April	4
May	0
June	2
July	2
August	2
September	2
October	0
November	0
December	0

Table 8
Monthly PM_{10} Emission Factors and Emissions for Unpaved Roads

Month	Monthly Emission Factor	1999 Emissions (tons)	2016 Emissions (tons)
January	0.5869	899	584
February	0.5478	754	490
March	0.5869	899	584
April	0.5086	754	490
May	0.5869	899	584
June	0.5478	812	528
July	0.5478	841	547
August	0.5478	841	547
September	0.5478	812	528
October	0.5869	899	584
November	0.5869	870	566
December	0.5869	899	584
Total		**10,183**	**6,617**

In developing inputs for air quality modeling, unpaved road emissions were broken out into two subcategories: emissions from unpaved public roads; and emissions from agricultural roads. The emissions for unpaved public roads is assumed to be 15% of the total (i.e. 15% of the unpaved road travel occurs on unpaved public roads), while the remaining 85% of emissions occur from agricultural roads (Ramos, 2003).

E. PAVED ROADS - RE-ENTRAINED DUST, EXHAUST, AND TIRE WEAR

Emission factors for paved roads were calculated using a combination of the AP-42 paved road emission factor equation and EPA's PART5 and MOBILE6.1 models. The following equation is from Section 13.2.1 of AP-42 (EPA, 2001b):

$$E = 7.3\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5}$$

where:

E = size specific emission factor (g/VMT);
sL = road surface silt loading (g/m^2); and
W = average vehicle weight in tons.

An average vehicle weight of 3 tons, the national average, was used. Road surface silt loading values were taken from two sources. The surface silt loadings for arterials, rural collectors, and local roads were determined from soil samples taken from various roads in the Yuma area by ADEQ in January 2002 (Catlin, 2002). Laboratory analysis of the samples was performed by Kleinfelder, Inc. The silt loadings were reported as silt percentages, and were converted to g/m^2 using the following equation:

$$sL = \frac{S \bullet \left(w_{b\&s} - w_b\right)}{A}$$

where:

S = the silt content in percent
$w_{b\&s}$ = the weight of the bag and sample in grams
w_b = the weight of the bag in grams
A = the area vacuumed in m^2

The results of the silt measurements are shown in Table 9. The result of the first rural minor collector sample was removed because it is unusually high compared to the second sample and the silt loading from an earlier analysis (0.24 g/m^2). In addition, the laboratory analysis noted that the material in this sample contained some asphaltic bituminous material that melted when heated. This had an effect on the laboratory's ability to reclaim the material for an accurate dry weight. Silt loadings for interstates and urban collectors were taken from the previous analysis (Lima & Associates, 2000). Table 10 shows the silt loadings used for each of the 9 road types.

Table 9
2002 Silt Loading Measurements (g/m^2)

Road Type	Sample 1	Sample 2	Sample 3	Average
Principal arterial	0.32	0.28	-	0.30
Local paved	1.21	0.17	1.16	0.85
Rural minor collector	2.47	0.70	-	0.70

Table 10
Silt Loadings (g/m^2) by Road Type

Road Type	Silt Loading (g/m^2)
Interstate	0.04
Principal Arterials	0.30
Minor Arterials	0.30
Rural Major Collectors	0.70
Rural Minor Collectors	0.70
Urban Collectors	0.24
Local Roads	0.85
Interstate Ramps	0.04
Local	0.85

The AP-42 equation above encompasses reentrained road dust, brake wear, tire wear, and vehicle exhaust, based on the empirical relationship that existed at the time the emission factor equation was developed. Thus, the AP-42 equation produces emission factors that are higher than would be accounted for by today's vehicles that have lower PM_{10} exhaust emission factors due to lower emission standards. In addition, the 2016 exhaust emission PM_{10} emission factors will be even lower due to the Tier 2 emission standards and the heavy duty vehicle emission standards. EPA is currently revising the AP-42 equation to exclude the exhaust portion of the paved road emissions from this equation. For this analysis, EPA's PART5 model was used to obtain the reentrained road dust, brake wear, and tire wear portions of the paved road emission factors (EPA, 1995). As part of the PART5 output, the paved road reentrained road dust plus brake wear emission factors are available. These emission factors are shown in Table 11. Also, based on the PART5 output, the brake wear accounts for 0.013 grams per mile in all of the PART5 emission factors. Table 11 also shows the PART5 tire wear emission factor. This value does not change by road type or year. MOBILE6.1, another EPA model, was used to calculate 1999 and 2016 exhaust emission factors (EPA, 2002). The MOBILE6.1 exhaust emission factors account for Tier 2 emission standards and 2007 heavy duty emission standards that are not incorporated in PART5. These exhaust emission factors are shown in Table 11. However, MOBILE6.1 does not include reentrained road dust emission factors, while both PART5 and MOBILE6.1 use the same information for calculating brake wear and tire wear emission factors. Therefore, the PART5 emission factors for fugitive dust and brake and tire wear, and the MOBILE6.1 *exhaust* emission factors were used to calculate emission factors, because they are more representative of the 1999 and 2016 vehicle populations.

Daily VMT estimates were obtained from the PM_{10} emissions analysis prepared by Lima & Associates for the Arizona Department of Transportation and the YMPO (Lima & Associates, 2000). VMT for each roadway type was estimated using TransCAD GIS based modeling software. Lima & Associates projected 2013 and 2025 daily VMT on paved roads (Lima & Associates, 2002). Daily VMT estimates were not available for 2016 for this analysis. Therefore, the average annual growth rate was calculated for each road type from 2013 to 2025. Three years of growth at this annual growth rate

were then applied to the 2013 VMT by road type to estimate 2016 average daily VMT on paved roads. The 1999,

Table 11
1999 and 2016 PM_{10} Paved Road Emission Factors by Road Type

Roadway Type	Speed (mph)	Silt Loading (g/m^2)	AP-42 Equation, 1999 & 2016 (includes Reentrained Dust, Brake Wear, Tire Wear, and Exhaust)	PART5 1999 and 2016 Paved Road Reentrained Dust plus Brake Wear Emission Factor (g/mi)	PART5 1999 and 2016 Tire Wear Emission Factor (g/mi)	1999 MOBILE6.1 PM_{10} Exhaust Emission Factor (g/mi)	2016 MOBILE6.1 PM_{10} Exhaust Emission Factor (g/mi)	1999 Total Paved Road PM_{10} Emission Factor (includes Reentrained Dust, Tire Wear, Brake Wear, and Exhaust)	2016 Total Paved Road PM_{10} Emission Factor (includes Reentrained Dust, Tire Wear, Brake Wear, and Exhaust)
Interstate	55	0.04	0.57	0.37	0.009	0.064	0.011	0.443	0.390
Principal Arterials	42	0.3	2.13	1.92	0.009	0.064	0.011	1.993	1.940
Minor Arterials	40	0.3	2.13	1.92	0.009	0.064	0.011	1.993	1.940
Rural Major Collectors	45	0.7	3.69	3.49	0.009	0.064	0.011	3.563	3.510
Rural Minor Collectors	46	0.7	3.69	3.49	0.009	0.064	0.011	3.563	3.510
Urban Collectors	35	0.24	1.84	1.64	0.009	0.064	0.011	1.713	1.660
Local Roads	35	0.85	4.19	3.98	0.009	0.065	0.011	4.054	4.000
Interstate Ramps	35	0.04	0.57	0.37	0.009	0.064	0.011	0.443	0.390
Local	20	0.85	4.19	3.98	0.009	0.065	0.011	4.054	4.000

NOTES: Emission factors are in grams per mile.

2013, and 2025 VMT, as well as the calculated annual growth rates between 2013 and 2025, and the estimated 2016 VMT are all shown in Table 12.

As with unpaved roads, the paved road reentrained dust emission factors were corrected for the effects of precipitation. Monthly emission factors for paved roads were calculated using a similar method as that used for unpaved roads. Precipitation is assumed to affect paved roads half as much as unpaved roads; therefore, the following equation is used:

$$E_{corr} = E\left(\frac{N - 0.5p}{N}\right)$$

where:

E_{corr} = monthly emission factor corrected for precipitation effects;
E = the uncorrected emission factor;
N = number of days in the month; and
p = number of days in the month with > 0.01 inches of rain.

Emission factors adjusted for precipitation effects were then calculated by month and road type. Only the fugitive dust portion of the emission factor was adjusted for precipitation effects. No adjustments were applied to the brake wear, tire wear, or exhaust portions of the emission factors. The resulting monthly emission factors by road type are shown in Tables 13 and 14 for 1999 and 2016, respectively. Monthly VMT was estimated by month and road type by multiplying the average daily VMT values by the number of days in each month for each road type. The monthly emission factors were then multiplied by the monthly VMT for each road type. The emission results are shown in Table 13 for 1999 and in Table 14 for 2016.

F. ROAD CONSTRUCTION

Construction emissions are estimated using two basic construction parameters, the acres of land disturbed by the construction activity and the duration of the activity. Data on the actual acres disturbed by road construction are generally not available, so a surrogate is used. The 1999 NEI emission estimation methods for road construction use the following miles to acres conversions by roadway type:

- Interstate, urban and rural; Other arterial, urban – 15.2 acres/mile
- Other arterial, rural – 12.7 acres/mile
- Collectors, urban – 9.8 acres/mile
- Collectors, rural – 7.9 acres/mile

Table 12
1999 and 2016 Daily VMT by Road Type

Road Type	1999 Daily VMT (miles per day)	2013 Daily VMT (miles per day)	2025 Daily VMT (miles per day)	Average Annual Growth Rate from 2013 to 2025	Estimated 2016 Daily VMT (miles per day)
Interstate	541,163	866,379	986,872	1.09%	895,048
Principal Arterials	860,715	1,564,166	1,768,187	1.03%	1,612,851
Minor Arterials	672,408	1,137,824	1,443,793	2.00%	1,207,626
Rural Major Collectors	91,129	198,520	289,087	3.18%	218,077
Rural Minor Collectors	448,640	870,923	1,028,207	1.39%	907,831
Urban Collectors	139,709	232,904	271,676	1.29%	242,045
Local Roads	4,841	17,387	21,204	1.67%	18,271
Interstate Ramps	50,581	84,437	94,825	0.97%	86,922
Local Paved	889,680	1,361,490	1,678,386	1.76%	1,434,610
Total	**3,698,866**	**6,334,030**	**7,582,237**		**6,623,281**

NOTES: The 1999 Daily VMT estimates are from Lima & Associates, 2000. The 2013 and 2025 Daily VMT estimates are from Lima & Associates, 2002.

Table 13
1999 Paved Road Emission Factors by Month and Road Type and Emissions by Road Type

Month	No. of Days with >0.01 inches of precip.	Interstate	Principal Arterial	Minor Arterial	Rural Major Collector	Rural Minor Collector	Urban Collector	Local Roads	Interstate Ramps	Local Paved	Total Paved Roads
Jan	0	0.443	1.993	1.993	3.563	3.563	1.713	4.054	0.443	4.054	
Feb	2	0.430	1.924	1.924	3.438	3.438	1.654	3.912	0.430	3.912	
Mar	0	0.443	1.993	1.993	3.563	3.563	1.713	4.054	0.443	4.054	
Apr	4	0.419	1.865	1.865	3.331	3.331	1.604	3.789	0.419	3.789	
May	0	0.443	1.993	1.993	3.563	3.563	1.713	4.054	0.443	4.054	
Jun	2	0.431	1.929	1.929	3.447	3.447	1.658	3.921	0.431	3.921	
Jul	2	0.431	1.931	1.931	3.450	3.450	1.660	3.926	0.431	3.926	
Aug	2	0.431	1.931	1.931	3.450	3.450	1.660	3.926	0.431	3.926	
Sep	2	0.431	1.929	1.929	3.447	3.447	1.658	3.921	0.431	3.921	
Oct	0	0.443	1.993	1.993	3.563	3.563	1.713	4.054	0.443	4.054	
Nov	0	0.443	1.993	1.993	3.563	3.563	1.713	4.054	0.443	4.054	
Dec	0	0.443	1.993	1.993	3.563	3.563	1.713	4.054	0.443	4.054	
Average Daily VMT (miles/day)		541,163	860,715	672,408	91,129	448,640	139,709	4,841	50,581	889,680	3,698,866
Annual Emissions (tons)		**95**	**677**	**529**	**128**	**631**	**95**	**8**	**9**	**1,424**	**3,595**

Table 14
2016 Paved Road Emission Factors by Month and Road Type and Emissions by Road Type

Month	No. of Days with >0.01 inches of precip.	Interstate	Principal Arterial	Minor Arterial	Rural Major Collector	Rural Minor Collector	Urban Collector	Local Roads	Interstate Ramps	Local Paved	Total Paved Roads
Jan	0	0.390	1.940	1.940	3.510	3.510	1.660	4.000	0.390	4.000	
Feb	2	0.377	1.874	1.874	3.390	3.390	1.603	3.863	0.377	3.863	
Mar	0	0.390	1.940	1.940	3.510	3.510	1.660	4.000	0.390	4.000	
Apr	4	0.366	1.812	1.812	3.278	3.278	1.551	3.735	0.366	3.735	
May	0	0.390	1.940	1.940	3.510	3.510	1.660	4.000	0.390	4.000	
Jun	2	0.378	1.876	1.876	3.394	3.394	1.605	3.867	0.378	3.867	
Jul	2	0.378	1.878	1.878	3.397	3.397	1.607	3.872	0.378	3.872	
Aug	2	0.378	1.878	1.878	3.397	3.397	1.607	3.872	0.378	3.872	
Sep	2	0.378	1.876	1.876	3.394	3.394	1.605	3.867	0.378	3.867	
Oct	0	0.390	1.940	1.940	3.510	3.510	1.660	4.000	0.390	4.000	
Nov	0	0.390	1.940	1.940	3.510	3.510	1.660	4.000	0.390	4.000	
Dec	0	0.390	1.940	1.940	3.510	3.510	1.660	4.000	0.390	4.000	
Average Daily VMT (miles/day)		895,048	1,612,851	1,207,626	218,077	907,831	242,045	18,271	86,922	1,434,610	6,623,281
Annual Emissions (tons)		**138**	**1,238**	**927**	**303**	**1,261**	**159**	**29**	**13**	**2,271**	**6,340**

The number of miles of highway constructed in 1999 and 2013 projections, shown in Table 15, were provided by local officials. Activity in 2016 is assumed to be equivalent to the 2013 projected activity. The type of roadways constructed was not available; therefore, 9.8 acres/mile was assumed for all roads.

Table 15
1999 and 2016 Miles of Roadway Constructed and PM_{10} Emissions

Location	1999 Miles of Roadway Constructed	1999 Emissions (tons)	2016 Miles of Roadway Constructed	2016 Emissions (tons)
Somerton	2.52	1,383	0	0
City of Yuma	7.2	3,951	11.1	6,092
Yuma Co.	1.9	384	3.6	2,634
ADOT	0.7	1,043	4.8	1,976
Total		**6,761**		**10,702**

Emissions were calculated using the total acres disturbed, the PM_{10} emission factor of 0.42 tons/acre/month, and the activity duration, estimated to be 12 months. Adjustments were made to the PM_{10} emissions to account for conditions in Yuma including correction parameters for soil moisture level and silt content (MRI, 1999). The corrected emissions were calculated using the following equation:

$$E_{corr} = E\left(24/PE\right)\left(s/9\right)$$

where:

E_{corr} = emissions corrected for soil moisture and silt content;
E = uncorrected emissions;
PE = PE index (moisture level); and
s = surface silt content (percentage).

Soil moisture levels were estimated using precipitation-evaporation values from Thornthwaite's PE Index. The PE value for Yuma County is 6. A silt content value of 40 percent was used. This value was used to calculate 1999 NEI emissions for Yuma County and was determined by comparing the U.S. Department of Agriculture surface soil map with the county map.

G. GENERAL BUILDING CONSTRUCTION

This category includes residential building (housing) construction and commercial building construction. Housing construction PM_{10} emissions were calculated using an emission factor of 0.032 tons PM_{10}/acre/month, the number of housing units constructed, a units-to-acres conversion factor, and the duration of construction activity. The duration of construction activity is assumed to be 6 months (MRI, 1999). The equation for calculating emissions from residential construction is:

Emissions = (0.032 tons PM_{10}/acre/month) * B * f * m

where:

B = number of single- or two-family homes constructed;
f = buildings-to-acres conversion factor; and
m = duration of construction activity in months.

Apartment construction emissions were computed separately using an emission factor that is more representative of emissions from apartment building construction (0.11 tons PM_{10}/acre/month). A 12-month duration is assumed for apartment construction. The same emission factor and duration were used for warehouse construction.

The total acres disturbed by construction is estimated by applying conversion factors to the housing start data for each category as follows:

- Single family - 1/4 acre/building
- Two family - 1/3 acre/building
- Apartment - ½ acre/building or 1/20 acre/unit

These conversion factors were used unless they were larger than 1999 average lot sizes reported by local officials. Average lot size was used for all Yuma County buildings and City of Yuma single family houses and duplexes. The warehouse average lot size of 7 acres provided by the City of Yuma seemed excessively large, and there were no acres per building conversion factors available for warehouses. Therefore, the average warehouse lot size provided by Yuma County was also used for the 8 warehouses constructed in the City of Yuma.

The number of single-family, two-family, and apartment buildings and warehouses constructed in 1999 and 2013 projections were provided by Somerton, Yuma, and Yuma County officials. The data provided by Somerton combined single-family and two-family data; therefore, all units were assumed to be single-family buildings. The number of single family houses, duplexes, and warehouses constructed in 1999 and 2013 projections and the acre/unit used for each is shown in Table 16. Activity in the 2016 projection year is assumed to be the same as projected for 2013. The 1999 and 2016 emission estimates in tons per year (tpy) for building construction are given in Table 17.

Table 16
1999 and 2013 Housing Starts and Acres/Unit Conversions

		1999		2013	
	Unit Type	**No. of Units**	**Acres/Unit**	**No. of Units**	**Acres/Unit**
Yuma Co.	single family	370	0.25	370	0.25
	warehouses	8	1.30	8	1.30
City of Yuma	single family	251	0.184	1533	0.184
	duplex	2	0.184	6	0.184
	apartment	44	0.05	111	0.05

	warehouses	8	1.30	7	1.30
Somerton	single family	393	0.25	393	0.25
	apartment	84	0.05	84	0.05

Table 17
1999 and 2016 PM_{10} Emission Estimates for Building Construction

Area	Unit Type	1999 Emissions (tons)	2016 Emissions (tons)
	single family	11.1	11.1
Yuma Co.	warehouses	14.8	14.8
	single family	5.51	33.8
	duplex	0.04	0.13
	apartment	1.82	9.16
City of Yuma	warehouses	14.8	13.0
	single family	3.24	3.24
Somerton	apartment	2.48	2.48
Totals		**53.8**	**87.7**

H. AIRCRAFT

The basic method for estimating emissions for this category involves determining aircraft fleet make-up and level of activity and this is matched with the appropriate emission factors by aircraft type to estimate daily or annual emissions. Aircraft emission estimates focus on emissions that occur close enough to the ground to affect ground-level concentrations. Aircraft operations within this layer are defined as landing and takeoff (LTO) cycle. The five specific operating modes in an LTO are:

- Approach
- Taxi/idle-in
- Taxi/idle-out
- Takeoff
- Climbout

The following PM_{10} emission factors were used for calculating emissions (EPA, 1992).

Air Taxi: 0.60333 pounds/LTO
Military Aircraft: 0.60333 pounds/LTO

Air taxi refers to small aircraft used for scheduled service carrying passengers and/or freight.

LTO information was provided by the U.S. Border Patrol, the Marine Corps Air Station, the Yuma Proving Ground, and Yuma International Airport, shown in Table 18. The number of flights per day is expected to decrease at Yuma International Airport between 1999 and 2013 due to a decrease in the number of passengers to the Yuma

market and the subsequent increased fares to Yuma. The 2013 estimates provided by the sources above are assumed to be representative of 2016 activity.

Table 18
1999 and 2016 LTO Data and Emission Estimates for Yuma Airports

Airport	1999 Daily LTOs	1999 Emissions (tons)	2016 Daily LTOs	2016 Emissions (tons)
U.S. Border Patrol	2	0.22	6	0.66
Marine Corp Air Station	60	6.60	69	7.60
Yuma Proving Ground	54	5.95	54	5.95
Yuma Intl. Airport	25	2.75	20	2.20
Total		**15.5**		**16.4**

I. UNPAVED AIRSTRIPS

PM_{10} emissions from unpaved airstrips were estimated using the same equation as was used for unpaved roads. The soil silt content and moisture content were assumed to be 3 percent and 1 percent, respectively. An average speed of 40 mph was used, and the length of one LTO was assumed to be 1 mile. The number of flights per week for the two unpaved airstrips in the Yuma nonattainment area, shown in Table 19, was provided by local officials. The number of LTOs estimated by these officials for 2013 is assumed to be representative of activity in 2016.

Table 19
1999 and 2016 LTO Data and Emissions for Unpaved Airstrips

	1999			2016		
Airstrip	Flights per Week	Average Annual LTOs	Emission (lbs)	Flights per Week	Average Annual LTOs	Emission (lbs)
Somerston	7-10	442	202	15	780	356
Pierce Aviation	70-80	3,900	1,781	70-80	3,900	1,781
Total		**4,342**	**1,982**		**4,680**	**2,137**

J. STATIONARY SOURCES

1999 PM_{10} emissions for 5 categories of stationary sources, shown in Table 20, were provided by ADEQ. 2016 emissions were calculated by applying growth factors to the 1999 emissions. The growth factors were based on industry sector constant dollar output projections from Regional Economics Model, Inc. (REMI) economic models incorporated into Version 4.0 of the Economic Growth Analysis System (EGAS) (Pechan, 2001). Table 21 shows the 1999 and 2016 REMI data for each sector. The growth factors,

the ratio of 2016 output to 1999 output, are also shown in Table 21. The growth factor for manufacturing stationary sources was calculated by summing the REMI data for REMI sectors 1 (lumber and wood products), 3 (stone, clay, and glass products), 16 (paper and allied products), and 18 (chemical and allied products).

Table 20
1999 and 2016 PM_{10} Stationary Source Emissions

Sector	1999 Emissions (tons)	2016 Emissions (tons)
Support activities for agriculture	10	14
Utilities	50	73
Manufacturing	6	11
National Security	1	1
Rock Products	10	20
Total	**77**	**119**

Table 21
1999 and 2016 REMI Data and Growth Factors

Sector	REMI Sector	1999 REMI Data	2016 REMI Data	2016 Growth Factor
Support activities for agriculture	49	0.656	0.893	1.361
Utilities	30	1.883	2.740	1.455
Manufacturing	1,3,16, and 18	3.839	10.267	1.877
National Security	52	4.608	4.800	1.042
Rock Products	3	1.631	3.291	2.018

K. RAILROAD LOCOMOTIVES

The 1999 NEI estimates that railroad locomotives contribute 17 tpy of PM_{10} in the Yuma Nonattainment Area. Estimation methods are described in the Trends Procedures Document (EPA, 2001a). Future year activity changes affecting emission estimates are based on earnings projections for Railroad Transportation.

In January 1997, EPA proposed draft locomotive emission standards to control emissions of oxides of nitrogen, volatile organic compounds, carbon monoxide, PM, and smoke from newly manufactured and remanufactured diesel-powered locomotives and locomotive engines. In December 1997, EPA promulgated the locomotive emission standards (EPA, 1997). The locomotive standards are to be implemented in three

phases, depending on the manufacture date. Tier 0 applies to the remanufacturing of locomotives and locomotive engines manufactured from 1973 through 2001. Tier I applies to the original manufacture and remanufacturing of locomotives and locomotive engines manufactured from 2002 through 2004. Tier II applies to the original manufacture and remanufacturing of locomotives and locomotive engines manufactured in 2005 and later. When fully phased-in by 2040, EPA estimates that the rule will achieve a 46 percent reduction in PM emissions. Emission estimates for 1999 and 2016 are shown in Table 22 below.

L. SUMMARY

Table 22 summarizes the 1999 and 2016 PM_{10} emissions by source category for the Yuma area. These source categories are listed in the same order that they appear in this report. With the exception of windblown dust, the emission estimates summarized in Table 22 are for the Yuma County portion of the nonattainment area. In total, 2016 emissions are expected to be at the same level that they were in 1999. The largest PM_{10} emission reductions between 1999 and 2013 come from paving unpaved roads, and through reducing the acreage that is susceptible to windblown dust. These PM_{10} emission reductions are offset by increased PM_{10} emissions resulting from increased travel on paved roads and more road construction occurring in 2016 than in 1999. Agriculture-related PM_{10} emissions are expected to remain steady during the study period.

Table 22
Yuma PM_{10} Nonattainment Area Emissions Summary - 1999 and 2016[1]

	1999 Annual Emissions (tons)	2016 Annual Emissions (tons)
Agricultural and Prescribed Burning	40.7	34.1
Agricultural Tilling	3,572	3,572
Agricultural Cultivation and Harvesting	15.7	15.7
Windblown Dust	130,331	127,046
Unpaved Roads - Re-entrained Dust	10,183	5,537
Paved Roads	3,419	5,839
Road Construction	6,761	10,702
General Building Construction	53.8	87.7
Aircraft	15.5	16.4
Unpaved Airstrips	1.0	1.1
Stationary Sources	77	119
Railroad Locomotives	17	15
Total	**154,487**	**152,985**

[1]With the exception of windblown dust, all emission estimates are for the Yuma County portion of the nonattainment area.

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Zerkoune, 2002: M. Zerkoune, University of Arizona Cooperative Extension, personal communication with S. Roe, E.H. Pechan & Associates, Inc., January 17, 2002.

APPENDIX A. PART5 Output Files

Interstate :Scenario Desc
Particle Size Cutoff 10.00 Microns Altitude: 500. Ft. Driving: Transient RFG:No
Cal. Year: 1999 I/M Program: No Region: Low

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Veh. Speeds:	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
VMT Mix:	0.6173	0.1883	0.0853	0.0310	0.0064	0.0017	0.0012	0.0126	0.0013	0.0161	0.0357	0.0032	
Composite Emission Factors (g/mi)													
Exhaust PM:	0.013	0.018	0.025	0.112	0.020	0.213	0.244	0.188	0.857	0.719	0.827	0.699	0.065
Brake:	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Tire:	0.008	0.008	0.008	0.012	0.004	0.008	0.008	0.008	0.012	0.012	0.036	0.008	0.009
Total PM:	0.056	0.069	0.076	0.190	0.046	0.264	0.302	0.271	0.981	0.864	1.022	0.861	0.119

Fugitive Dust: Unpaved Roads Fleet Average 598.24 g/mi (as calculated in AP42 Vol 1 9/88)*
Paved Roads Fleet Average 0.57 g/mi (as calculated in draft AP42 Vol 1 3/93)*
Unpaved Roads Fleet Average 598.04 g/mi (as calculated in AP42 Vol 1 9/88, minus tailpipe and tire-wear emissions)**
Paved Roads Fleet Average 0.37 g/mi (as calculated in draft AP42 Vol 1 3/93, minus tailpipe and tire-wear emissions)**

* Includes fleet average tailpipe, tire-wear and brake-wear emissions.
** Includes fleet average brake-wear emissions.

Paved Road Silt: 0.04 (g/m^2) Fleet average vehicle weight: 6000
Unpaved Silt: 4.3% Fleet average number of wheels: 4
Precipitation Days: 20 >0.01 in. (per year)

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Gas. SO2: (g/mi) :	0.078	0.104	0.105	0.186	0.033	0.108	0.132	0.215	0.345	0.421	0.509	0.494	0.113

Principal Art :Scenario Desc
Particle Size Cutoff 10.00 Microns Altitude: 500. Ft. Driving: Transient RFG:No
Cal. Year: 1999 I/M Program: No Region: Low

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Veh. Speeds:	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0

```
    VMT Mix: 0.6173  0.1883  0.0853  0.0310  0.0064  0.0017  0.0012  0.0126  0.0013  0.0161  0.0357  0.0032
Composite Emission Factors (g/mi)
 Exhaust PM: 0.013   0.018   0.025   0.112   0.020   0.213   0.244   0.188   0.857   0.719   0.827   0.699   0.065
 Brake:      0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013
 Tire:       0.008   0.008   0.008   0.012   0.004   0.008   0.008   0.008   0.012   0.012   0.036   0.008   0.009
 Total PM:   0.056   0.069   0.076   0.190   0.046   0.264   0.302   0.271   0.981   0.864   1.022   0.861   0.119
```

```
Fugitive Dust: Unpaved Roads Fleet Average  456.84 g/mi (as calculated in AP42 Vol 1 9/88)*
                 Paved Roads Fleet Average    2.13 g/mi (as calculated in draft AP42 Vol 1 3/93)*
               Unpaved Roads Fleet Average  456.63 g/mi (as calculated in AP42 Vol 1 9/88, minus tailpipe and
                                                         tire-wear emissions)**
                 Paved Roads Fleet Average    1.92 g/mi (as calculated in draft AP42 Vol 1 3/93, minus tailpipe
                                                         and tire-wear emissions)**

*  Includes fleet average tailpipe, tire-wear and brake-wear emissions.
** Includes fleet average brake-wear emissions.

 Paved Road Silt:  0.30 (g/m^2)                          Fleet average vehicle weight:   6000
 Unpaved Silt:  4.3%                                     Fleet average number of wheels:  4
 Precipitation Days:   20 >0.01 in. (per year)
```

```
                                                                                                          All
  Veh. Type:  LDGV   LDGT1   LDGT2    HDGV     MC     LDDV    LDDT   2BHDDV  LHDDV   MHDDV   HHDDV   BUSES    Veh.
Gas. SO2:
   (g/mi) :  0.078   0.104   0.105   0.186   0.033   0.108   0.132   0.215   0.345   0.421   0.509   0.494   0.113
```

```
Minor Arterial:Scenario Desc
Particle Size Cutoff 10.00 Microns            Altitude:  500. Ft.              Driving:  Transient RFG:No
Cal. Year: 1999                               I/M Program: No                  Region:   Low               All
  Veh. Type:  LDGV   LDGT1   LDGT2    HDGV     MC     LDDV    LDDT   2BHDDV  LHDDV   MHDDV   HHDDV   BUSES    Veh.
            ______  ______  ______  ______  ______  ______  ______  ______  ______  ______  ______  ______  ______
Veh. Speeds:  40.0    40.0    40.0    40.0    40.0    40.0    40.0    40.0    40.0    40.0    40.0    40.0    40.0
    VMT Mix: 0.6173  0.1883  0.0853  0.0310  0.0064  0.0017  0.0012  0.0126  0.0013  0.0161  0.0357  0.0032
Composite Emission Factors (g/mi)
 Exhaust PM: 0.013   0.018   0.025   0.112   0.020   0.213   0.244   0.188   0.857   0.719   0.827   0.699   0.065
 Brake:      0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013
 Tire:       0.008   0.008   0.008   0.012   0.004   0.008   0.008   0.008   0.012   0.012   0.036   0.008   0.009
 Total PM:   0.056   0.069   0.076   0.190   0.046   0.264   0.302   0.271   0.981   0.864   1.022   0.861   0.119
```

```
Fugitive Dust: Unpaved Roads Fleet Average  435.08 g/mi (as calculated in AP42 Vol 1 9/88)*
                 Paved Roads Fleet Average    2.13 g/mi (as calculated in draft AP42 Vol 1 3/93)*
               Unpaved Roads Fleet Average  434.88 g/mi (as calculated in AP42 Vol 1 9/88, minus tailpipe and
```

```
                                                    tire-wear emissions)**
                Paved Roads Fleet Average    1.92 g/mi (as calculated in draft AP42 Vol 1 3/93, minus tailpipe
                                                    and tire-wear emissions)**

*  Includes fleet average tailpipe, tire-wear and brake-wear emissions.
** Includes fleet average brake-wear emissions.

 Paved Road Silt:  0.30 (g/m^2)                          Fleet average vehicle weight:   6000
 Unpaved Silt:  4.3%                                     Fleet average number of wheels:  4
 Precipitation Days:   20 >0.01 in. (per year)
```

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Gas. SO2: (g/mi) :	0.078	0.104	0.105	0.186	0.033	0.108	0.132	0.215	0.345	0.421	0.509	0.494	0.113

```
Rural Maj Col :Scenario Desc
Particle Size Cutoff 10.00 Microns              Altitude:  500. Ft.                Driving:  Transient RFG:No
Cal. Year: 1999                                 I/M Program: No                    Region:   Low
```

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Veh. Speeds:	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
VMT Mix:	0.6173	0.1883	0.0853	0.0310	0.0064	0.0017	0.0012	0.0126	0.0013	0.0161	0.0357	0.0032	
Composite Emission Factors (g/mi)													
Exhaust PM:	0.013	0.018	0.025	0.112	0.020	0.213	0.244	0.188	0.857	0.719	0.827	0.699	0.065
Brake:	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Tire:	0.008	0.008	0.008	0.012	0.004	0.008	0.008	0.008	0.012	0.012	0.036	0.008	0.009
Total PM:	0.056	0.069	0.076	0.190	0.046	0.264	0.302	0.271	0.981	0.864	1.022	0.861	0.119

```
Fugitive Dust: Unpaved Roads Fleet Average  489.47 g/mi (as calculated in AP42 Vol 1 9/88)*
                 Paved Roads Fleet Average    3.69 g/mi (as calculated in draft AP42 Vol 1 3/93)*
               Unpaved Roads Fleet Average  489.26 g/mi (as calculated in AP42 Vol 1 9/88, minus tailpipe and
                                                    tire-wear emissions)**
                 Paved Roads Fleet Average    3.49 g/mi (as calculated in draft AP42 Vol 1 3/93, minus tailpipe
                                                    and tire-wear emissions)**

*  Includes fleet average tailpipe, tire-wear and brake-wear emissions.
** Includes fleet average brake-wear emissions.

 Paved Road Silt:  0.70 (g/m^2)                          Fleet average vehicle weight:   6000
 Unpaved Silt:  4.3%                                     Fleet average number of wheels:  4
 Precipitation Days:   20 >0.01 in. (per year)
```

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Gas. SO2: (g/mi) :	0.078	0.104	0.105	0.186	0.033	0.108	0.132	0.215	0.345	0.421	0.509	0.494	0.113

Rural Min Col :Scenario Desc
Particle Size Cutoff 10.00 Microns Altitude: 500. Ft. Driving: Transient RFG:No
Cal. Year: 1999 I/M Program: No Region: Low

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Veh. Speeds:	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
VMT Mix:	0.6173	0.1883	0.0853	0.0310	0.0064	0.0017	0.0012	0.0126	0.0013	0.0161	0.0357	0.0032	
Composite Emission Factors (g/mi)													
Exhaust PM:	0.013	0.018	0.025	0.112	0.020	0.213	0.244	0.188	0.857	0.719	0.827	0.699	0.065
Brake:	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Tire:	0.008	0.008	0.008	0.012	0.004	0.008	0.008	0.008	0.012	0.012	0.036	0.008	0.009
Total PM:	0.056	0.069	0.076	0.190	0.046	0.264	0.302	0.271	0.981	0.864	1.022	0.861	0.119

Fugitive Dust: Unpaved Roads Fleet Average 500.35 g/mi (as calculated in AP42 Vol 1 9/88)*
Paved Roads Fleet Average 3.69 g/mi (as calculated in draft AP42 Vol 1 3/93)*
Unpaved Roads Fleet Average 500.14 g/mi (as calculated in AP42 Vol 1 9/88, minus tailpipe and tire-wear emissions)**
Paved Roads Fleet Average 3.49 g/mi (as calculated in draft AP42 Vol 1 3/93, minus tailpipe and tire-wear emissions)**

* Includes fleet average tailpipe, tire-wear and brake-wear emissions.
** Includes fleet average brake-wear emissions.

Paved Road Silt: 0.70 (g/m^2) Fleet average vehicle weight: 6000
Unpaved Silt: 4.3% Fleet average number of wheels: 4
Precipitation Days: 20 >0.01 in. (per year)

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Gas. SO2: (g/mi) :	0.078	0.104	0.105	0.186	0.033	0.108	0.132	0.215	0.345	0.421	0.509	0.494	0.113

Urban Collect :Scenario Desc
Particle Size Cutoff 10.00 Microns Altitude: 500. Ft. Driving: Transient RFG:No
Cal. Year: 1999 I/M Program: No Region: Low

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Veh. Speeds:	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

```
    VMT Mix: 0.6173  0.1883  0.0853  0.0310  0.0064  0.0017  0.0012  0.0126  0.0013  0.0161  0.0357  0.0032
Composite Emission Factors (g/mi)
 Exhaust PM: 0.013   0.018   0.025   0.112   0.020   0.213   0.244   0.188   0.857   0.719   0.827   0.699   0.065
 Brake:      0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013
 Tire:       0.008   0.008   0.008   0.012   0.004   0.008   0.008   0.008   0.012   0.012   0.036   0.008   0.009
 Total PM:   0.056   0.069   0.076   0.190   0.046   0.264   0.302   0.271   0.981   0.864   1.022   0.861   0.119
```

```
Fugitive Dust: Unpaved Roads Fleet Average  380.70 g/mi (as calculated in AP42 Vol 1 9/88)*
                 Paved Roads Fleet Average    1.84 g/mi (as calculated in draft AP42 Vol 1 3/93)*
               Unpaved Roads Fleet Average  380.49 g/mi (as calculated in AP42 Vol 1 9/88, minus tailpipe and
                                                         tire-wear emissions)**
                 Paved Roads Fleet Average    1.64 g/mi (as calculated in draft AP42 Vol 1 3/93, minus tailpipe
                                                         and tire-wear emissions)**

*  Includes fleet average tailpipe, tire-wear and brake-wear emissions.
** Includes fleet average brake-wear emissions.

 Paved Road Silt:  0.24 (g/m^2)                          Fleet average vehicle weight:   6000
 Unpaved Silt:  4.3%                                     Fleet average number of wheels:  4
 Precipitation Days:   20 >0.01 in. (per year)
```

```
                                                                                                          All
  Veh. Type:  LDGV   LDGT1   LDGT2    HDGV     MC     LDDV    LDDT   2BHDDV  LHDDV   MHDDV   HHDDV   BUSES    Veh.
Gas. SO2:
   (g/mi) :  0.078   0.104   0.105   0.186   0.033   0.108   0.132   0.215   0.345   0.421   0.509   0.494   0.113
```

```
Local Roads   :Scenario Desc
Particle Size Cutoff 10.00 Microns            Altitude:  500. Ft.              Driving:  Transient RFG:No
Cal. Year: 1999                               I/M Program: No                  Region:   Low               All
  Veh. Type:  LDGV   LDGT1   LDGT2    HDGV     MC     LDDV    LDDT   2BHDDV  LHDDV   MHDDV   HHDDV   BUSES    Veh.
            ______  ______  ______  ______  ______  ______  ______  ______  ______  ______  ______  ______  ______
Veh. Speeds:  35.0    35.0    35.0    35.0    35.0    35.0    35.0    35.0    35.0    35.0    35.0    35.0    35.0
    VMT Mix: 0.6173  0.1883  0.0853  0.0310  0.0064  0.0017  0.0012  0.0126  0.0013  0.0161  0.0357  0.0032
Composite Emission Factors (g/mi)
 Exhaust PM: 0.013   0.018   0.025   0.112   0.020   0.213   0.244   0.188   0.857   0.719   0.827   0.699   0.065
 Brake:      0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013   0.013
 Tire:       0.008   0.008   0.008   0.012   0.004   0.008   0.008   0.008   0.012   0.012   0.036   0.008   0.009
 Total PM:   0.056   0.069   0.076   0.190   0.046   0.264   0.302   0.271   0.981   0.864   1.022   0.861   0.119
```

```
Fugitive Dust: Unpaved Roads Fleet Average  380.70 g/mi (as calculated in AP42 Vol 1 9/88)*
                 Paved Roads Fleet Average    4.19 g/mi (as calculated in draft AP42 Vol 1 3/93)*
               Unpaved Roads Fleet Average  380.49 g/mi (as calculated in AP42 Vol 1 9/88, minus tailpipe and
```

```
                                                    tire-wear emissions)**
                Paved Roads Fleet Average    3.98 g/mi (as calculated in draft AP42 Vol 1 3/93, minus tailpipe
                                                    and tire-wear emissions)**

*  Includes fleet average tailpipe, tire-wear and brake-wear emissions.
** Includes fleet average brake-wear emissions.

 Paved Road Silt:  0.85 (g/m^2)                          Fleet average vehicle weight:   6000
 Unpaved Silt:  4.3%                                     Fleet average number of wheels:  4
 Precipitation Days:   20 >0.01 in. (per year)
```

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Gas. SO2: (g/mi) :	0.078	0.104	0.105	0.186	0.033	0.108	0.132	0.215	0.345	0.421	0.509	0.494	0.113

```
Interst Ramps :Scenario Desc
Particle Size Cutoff 10.00 Microns              Altitude:  500. Ft.              Driving:  Transient RFG:No
Cal. Year: 1999                                 I/M Program: No                  Region:   Low
```

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Veh. Speeds:	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
VMT Mix:	0.6173	0.1883	0.0853	0.0310	0.0064	0.0017	0.0012	0.0126	0.0013	0.0161	0.0357	0.0032	
Composite Emission Factors (g/mi)													
Exhaust PM:	0.013	0.018	0.025	0.112	0.020	0.213	0.244	0.188	0.857	0.719	0.827	0.699	0.065
Brake:	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Tire:	0.008	0.008	0.008	0.012	0.004	0.008	0.008	0.008	0.012	0.012	0.036	0.008	0.009
Total PM:	0.056	0.069	0.076	0.190	0.046	0.264	0.302	0.271	0.981	0.864	1.022	0.861	0.119

```
Fugitive Dust: Unpaved Roads Fleet Average  380.70 g/mi (as calculated in AP42 Vol 1 9/88)*
                 Paved Roads Fleet Average    0.57 g/mi (as calculated in draft AP42 Vol 1 3/93)*
               Unpaved Roads Fleet Average  380.49 g/mi (as calculated in AP42 Vol 1 9/88, minus tailpipe and
                                                    tire-wear emissions)**
                 Paved Roads Fleet Average    0.37 g/mi (as calculated in draft AP42 Vol 1 3/93, minus tailpipe
                                                    and tire-wear emissions)**

*  Includes fleet average tailpipe, tire-wear and brake-wear emissions.
** Includes fleet average brake-wear emissions.

 Paved Road Silt:  0.04 (g/m^2)                          Fleet average vehicle weight:   6000
 Unpaved Silt:  4.3%                                     Fleet average number of wheels:  4
 Precipitation Days:   20 >0.01 in. (per year)
```

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Gas. SO2: (g/mi) :	0.078	0.104	0.105	0.186	0.033	0.108	0.132	0.215	0.345	0.421	0.509	0.494	0.113

Local :Scenario Desc: fi
Particle Size Cutoff 10.00 Microns Altitude: 500. Ft. Driving: Transient RFG:No
Cal. Year: 1999 I/M Program: No Region: Low

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Veh. Speeds:	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
VMT Mix:	0.6173	0.1883	0.0853	0.0310	0.0064	0.0017	0.0012	0.0126	0.0013	0.0161	0.0357	0.0032	
Composite Emission Factors (g/mi)													
Exhaust PM:	0.013	0.016	0.024	0.112	0.020	0.213	0.244	0.188	0.857	0.719	0.827	0.699	0.064
Brake:	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Tire:	0.008	0.008	0.008	0.012	0.004	0.008	0.008	0.008	0.012	0.012	0.036	0.008	0.009
Total PM:	0.056	0.067	0.075	0.190	0.046	0.264	0.302	0.271	0.981	0.864	1.022	0.861	0.118

Fugitive Dust: Unpaved Roads Fleet Average 217.54 g/mi (as calculated in AP42 Vol 1 9/88)*
Paved Roads Fleet Average 4.19 g/mi (as calculated in draft AP42 Vol 1 3/93)*
Unpaved Roads Fleet Average 217.34 g/mi (as calculated in AP42 Vol 1 9/88, minus tailpipe and tire-wear emissions)**
Paved Roads Fleet Average 3.98 g/mi (as calculated in draft AP42 Vol 1 3/93, minus tailpipe and tire-wear emissions)**

* Includes fleet average tailpipe, tire-wear and brake-wear emissions.
** Includes fleet average brake-wear emissions.

Paved Road Silt: 0.85 (g/m^2) Fleet average vehicle weight: 6000
Unpaved Silt: 4.3% Fleet average number of wheels: 4
Precipitation Days: 20 >0.01 in. (per year)

Veh. Type:	LDGV	LDGT1	LDGT2	HDGV	MC	LDDV	LDDT	2BHDDV	LHDDV	MHDDV	HHDDV	BUSES	All Veh.
Gas. SO2: (g/mi) :	0.078	0.104	0.105	0.186	0.032	0.108	0.132	0.215	0.345	0.421	0.509	0.494	0.113

APPENDIX B. MOBILE6.1 Input and Output Files

```
MOBILE6.1 Calendar Year 1999

MOBILE6 INPUT FILE :

DAILY OUTPUT       :
AGGREGATED OUTPUT  :
PARTICULATES       :

RUN DATA           :
>



>SCENARIO: 1, Interstate
SCENARIO RECORD    : Interstate
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 55 Freeway
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 2, Principal Arterials
SCENARIO RECORD    : Principal Arterials
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 42.0 Arterial
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 3, Minor Arterials
SCENARIO RECORD    : Minor Arterials
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 40.0 Arterial
```

```
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 4, Rural Major Collectors

SCENARIO RECORD    : Rural Major Collectors
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 45.0 Arterial
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 5, Rural Minor Collectors

SCENARIO RECORD    : Rural Minor Collectors
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 46.0 Arterial
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 6, Urban Collectors
SCENARIO RECORD    : Urban Collectors
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 35.0 Arterial
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 7, Local Roads
SCENARIO RECORD    : Local Roads
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
```

```
VMT BY FACILITY    : FV3.FV
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 8, Interstate Ramps
SCENARIO RECORD    : Interstate Ramps
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
VMT BY FACILITY    : FV4.FV
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 9, Local
SCENARIO RECORD    : Local
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
VMT BY FACILITY    : FV3.FV
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 1
SCENARIO RECORD    : Temperature Test
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 55.0 Freeway
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 20. 30.
FUEL RVP           : 7.0

>SCENARIO: 1
SCENARIO RECORD    : RVP Test
CALENDAR YEAR      : 1999
EVALUATION MONTH   : 1
DIESEL SULFUR      : 500.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 55.0 Freeway
```

```
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 13.0


END OF RUN         :


* # # # # # # # # # # # # # # # # # # # # # # # #
* Interstate
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # #

                           Calendar Year:  1999
                                   Month:  Jan.
                Gasoline Fuel Sulfur Content:  300. ppm
                  Diesel Fuel Sulfur Content:  500. ppm
                        Particle Size Cutoff: 10.00 Microns
                           Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.5138	0.2687	0.0919		0.0356	0.0015	0.0017	0.0804	0.0064	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0046	0.0060	0.0171	0.0088	0.0904	------	------	------	0.0205	0.0089
ECARBON:	------	------	------	------	------	0.2259	0.1177	0.3860	------	0.0316
OCARBON:	------	------	------	------	------	0.0637	0.1693	0.1900	------	0.0157
SO4:	0.0044	0.0062	0.0064	0.0063	0.0077	0.0059	0.0095	0.0320	0.0009	0.0074
Total Exhaust PM:	0.0090	0.0122	0.0236	0.0151	0.0981	0.2955	0.2965	0.6080	0.0214	0.0635
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0088	0.0080	0.0080	0.0261	0.0040	0.0095
Total PM:	0.0295	0.0327	0.0441	0.0356	0.1195	0.3161	0.3170	0.6467	0.0379	0.0855
SO2:	0.0689	0.0808	0.1159	0.0897	0.1784	0.1129	0.1819	0.4568	0.0329	0.1115
NH3:	0.0996	0.0959	0.0892	0.0942	0.0451	0.0068	0.0068	0.0270	0.0113	0.0890

```
* # # # # # # # # # # # # # # # # # # # # # # # #
* Principal Arterials
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # #

                           Calendar Year:  1999
```

```
                                Month:  Jan.
              Gasoline Fuel Sulfur Content:  300. ppm
                Diesel Fuel Sulfur Content:  500. ppm
                      Particle Size Cutoff: 10.00 Microns
                          Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.5138    0.2687    0.0919              0.0356    0.0015    0.0017    0.0804    0.0064    1.0000
 -------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
              Lead:    0.0000    0.0000    0.0000    0.0000    0.0000    ------    ------    ------    0.0000    0.0000
             GASPM:    0.0046    0.0060    0.0171    0.0088    0.0904    ------    ------    ------    0.0205    0.0089
           ECARBON:    ------    ------    ------    ------    ------    0.2259    0.1177    0.3860    ------    0.0316
           OCARBON:    ------    ------    ------    ------    ------    0.0637    0.1693    0.1900    ------    0.0157
               SO4:    0.0044    0.0062    0.0064    0.0063    0.0077    0.0059    0.0095    0.0320    0.0009    0.0074
  Total Exhaust PM:    0.0090    0.0122    0.0236    0.0151    0.0981    0.2955    0.2965    0.6080    0.0214    0.0635
             Brake:    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
              Tire:    0.0080    0.0080    0.0080    0.0080    0.0088    0.0080    0.0080    0.0261    0.0040    0.0095
          Total PM:    0.0295    0.0327    0.0441    0.0356    0.1195    0.3161    0.3170    0.6467    0.0379    0.0855
               SO2:    0.0689    0.0808    0.1159    0.0897    0.1784    0.1129    0.1819    0.4568    0.0329    0.1115
               NH3:    0.0996    0.0959    0.0892    0.0942    0.0451    0.0068    0.0068    0.0270    0.0113    0.0890
 -------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Minor Arterials
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # #

                           Calendar Year:  1999
                                Month:  Jan.
              Gasoline Fuel Sulfur Content:  300. ppm
                Diesel Fuel Sulfur Content:  500. ppm
                      Particle Size Cutoff: 10.00 Microns
                          Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.5138    0.2687    0.0919              0.0356    0.0015    0.0017    0.0804    0.0064    1.0000
 -------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
              Lead:    0.0000    0.0000    0.0000    0.0000    0.0000    ------    ------    ------    0.0000    0.0000
             GASPM:    0.0046    0.0060    0.0171    0.0088    0.0904    ------    ------    ------    0.0205    0.0089
```

ECARBON:	------	------	------	------	------	0.2259	0.1177	0.3860	------	0.0316
OCARBON:	------	------	------	------	------	0.0637	0.1693	0.1900	------	0.0157
SO4:	0.0044	0.0062	0.0064	0.0063	0.0077	0.0059	0.0095	0.0320	0.0009	0.0074
Total Exhaust PM:	0.0090	0.0122	0.0236	0.0151	0.0981	0.2955	0.2965	0.6080	0.0214	0.0635
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0088	0.0080	0.0080	0.0261	0.0040	0.0095
Total PM:	0.0295	0.0327	0.0441	0.0356	0.1195	0.3161	0.3170	0.6467	0.0379	0.0855
SO2:	0.0689	0.0808	0.1159	0.0897	0.1784	0.1129	0.1819	0.4568	0.0329	0.1115
NH3:	0.0996	0.0959	0.0892	0.0942	0.0451	0.0068	0.0068	0.0270	0.0113	0.0890

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural Major Collectors
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #

                          Calendar Year:  1999
                                 Month:  Jan.
               Gasoline Fuel Sulfur Content:  300. ppm
                 Diesel Fuel Sulfur Content:  500. ppm
                       Particle Size Cutoff: 10.00 Microns
                          Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
	------	------	------	------	------	------	------	------	------	------
VMT Distribution:	0.5138	0.2687	0.0919		0.0356	0.0015	0.0017	0.0804	0.0064	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0046	0.0060	0.0171	0.0088	0.0904	------	------	------	0.0205	0.0089
ECARBON:	------	------	------	------	------	0.2259	0.1177	0.3860	------	0.0316
OCARBON:	------	------	------	------	------	0.0637	0.1693	0.1900	------	0.0157
SO4:	0.0044	0.0062	0.0064	0.0063	0.0077	0.0059	0.0095	0.0320	0.0009	0.0074
Total Exhaust PM:	0.0090	0.0122	0.0236	0.0151	0.0981	0.2955	0.2965	0.6080	0.0214	0.0635
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0088	0.0080	0.0080	0.0261	0.0040	0.0095
Total PM:	0.0295	0.0327	0.0441	0.0356	0.1195	0.3161	0.3170	0.6467	0.0379	0.0855
SO2:	0.0689	0.0808	0.1159	0.0897	0.1784	0.1129	0.1819	0.4568	0.0329	0.1115
NH3:	0.0996	0.0959	0.0892	0.0942	0.0451	0.0068	0.0068	0.0270	0.0113	0.0890

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Rural Minor Collectors
* File 1, Run 1, Scenario 5.
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # # #

                            Calendar Year:  1999
                                    Month:  Jan.
                  Gasoline Fuel Sulfur Content:  300. ppm
                    Diesel Fuel Sulfur Content:  500. ppm
                          Particle Size Cutoff: 10.00 Microns
                              Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.5138	0.2687	0.0919		0.0356	0.0015	0.0017	0.0804	0.0064	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0046	0.0060	0.0171	0.0088	0.0904	------	------	------	0.0205	0.0089
ECARBON:	------	------	------	------	------	0.2259	0.1177	0.3860	------	0.0316
OCARBON:	------	------	------	------	------	0.0637	0.1693	0.1900	------	0.0157
SO4:	0.0044	0.0062	0.0064	0.0063	0.0077	0.0059	0.0095	0.0320	0.0009	0.0074
Total Exhaust PM:	0.0090	0.0122	0.0236	0.0151	0.0981	0.2955	0.2965	0.6080	0.0214	0.0635
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0088	0.0080	0.0080	0.0261	0.0040	0.0095
Total PM:	0.0295	0.0327	0.0441	0.0356	0.1195	0.3161	0.3170	0.6467	0.0379	0.0855
SO2:	0.0689	0.0808	0.1159	0.0897	0.1784	0.1129	0.1819	0.4568	0.0329	0.1115
NH3:	0.0996	0.0959	0.0892	0.0942	0.0451	0.0068	0.0068	0.0270	0.0113	0.0890

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Urban Collectors
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # #

                            Calendar Year:  1999
                                    Month:  Jan.
                  Gasoline Fuel Sulfur Content:  300. ppm
                    Diesel Fuel Sulfur Content:  500. ppm
                          Particle Size Cutoff: 10.00 Microns
                              Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.5138	0.2687	0.0919		0.0356	0.0015	0.0017	0.0804	0.0064	1.0000

Composite Emission Factors (g/mi):

Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0046	0.0060	0.0171	0.0088	0.0904	------	------	------	0.0205	0.0089
ECARBON:	------	------	------	------	------	0.2259	0.1177	0.3860	------	0.0316
OCARBON:	------	------	------	------	------	0.0637	0.1693	0.1900	------	0.0157
SO4:	0.0044	0.0062	0.0064	0.0063	0.0077	0.0059	0.0095	0.0320	0.0009	0.0074
Total Exhaust PM:	0.0090	0.0122	0.0236	0.0151	0.0981	0.2955	0.2965	0.6080	0.0214	0.0635
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0088	0.0080	0.0080	0.0261	0.0040	0.0095
Total PM:	0.0295	0.0327	0.0441	0.0356	0.1195	0.3161	0.3170	0.6467	0.0379	0.0855
SO2:	0.0689	0.0808	0.1159	0.0897	0.1784	0.1129	0.1819	0.4568	0.0329	0.1115
NH3:	0.0996	0.0959	0.0892	0.0942	0.0451	0.0068	0.0068	0.0270	0.0113	0.0890

* #
* Local Roads
* File 1, Run 1, Scenario 7.
* #

Calendar Year: 1999
Month: Jan.
Gasoline Fuel Sulfur Content: 300. ppm
Diesel Fuel Sulfur Content: 500. ppm
Particle Size Cutoff: 10.00 Microns
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.5138	0.2687	0.0919		0.0356	0.0015	0.0017	0.0804	0.0064	1.0000

Composite Emission Factors (g/mi):

Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0046	0.0060	0.0171	0.0088	0.0904	------	------	------	0.0205	0.0089
ECARBON:	------	------	------	------	------	0.2259	0.1177	0.3860	------	0.0316
OCARBON:	------	------	------	------	------	0.0637	0.1693	0.1900	------	0.0157
SO4:	0.0060	0.0068	0.0069	0.0068	0.0067	0.0059	0.0095	0.0320	0.0018	0.0084
Total Exhaust PM:	0.0106	0.0128	0.0240	0.0157	0.0971	0.2955	0.2965	0.6080	0.0222	0.0645
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0088	0.0080	0.0080	0.0261	0.0040	0.0095
Total PM:	0.0311	0.0333	0.0446	0.0362	0.1185	0.3161	0.3170	0.6467	0.0388	0.0865
SO2:	0.0684	0.0806	0.1158	0.0896	0.1787	0.1129	0.1819	0.4568	0.0326	0.1112
NH3:	0.0996	0.0959	0.0892	0.0942	0.0451	0.0068	0.0068	0.0270	0.0113	0.0890

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Interstate Ramps
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # #

                            Calendar Year:  1999
                                    Month:  Jan.
                Gasoline Fuel Sulfur Content:  300. ppm
                  Diesel Fuel Sulfur Content:  500. ppm
                         Particle Size Cutoff: 10.00 Microns
                             Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.5138	0.2687	0.0919		0.0356	0.0015	0.0017	0.0804	0.0064	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0046	0.0060	0.0171	0.0088	0.0904	------	------	------	0.0205	0.0089
ECARBON:	------	------	------	------	------	0.2259	0.1177	0.3860	------	0.0316
OCARBON:	------	------	------	------	------	0.0637	0.1693	0.1900	------	0.0157
SO4:	0.0044	0.0062	0.0064	0.0063	0.0077	0.0059	0.0095	0.0320	0.0009	0.0074
Total Exhaust PM:	0.0090	0.0122	0.0236	0.0151	0.0981	0.2955	0.2965	0.6080	0.0214	0.0635
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0088	0.0080	0.0080	0.0261	0.0040	0.0095
Total PM:	0.0296	0.0327	0.0441	0.0356	0.1195	0.3161	0.3170	0.6467	0.0379	0.0855
SO2:	0.0689	0.0808	0.1159	0.0897	0.1784	0.1129	0.1819	0.4568	0.0329	0.1115
NH3:	0.0996	0.0959	0.0892	0.0942	0.0451	0.0068	0.0068	0.0270	0.0113	0.0890

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Local
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # #

                            Calendar Year:  1999
                                    Month:  Jan.
                Gasoline Fuel Sulfur Content:  300. ppm
                  Diesel Fuel Sulfur Content:  500. ppm
                         Particle Size Cutoff: 10.00 Microns
                             Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						

VMT Distribution:	0.5138	0.2687	0.0919		0.0356	0.0015	0.0017	0.0804	0.0064	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0046	0.0060	0.0171	0.0088	0.0904	------	------	------	0.0205	0.0089
ECARBON:	------	------	------	------	------	0.2259	0.1177	0.3860	------	0.0316
OCARBON:	------	------	------	------	------	0.0637	0.1693	0.1900	------	0.0157
SO4:	0.0060	0.0068	0.0069	0.0068	0.0067	0.0059	0.0095	0.0320	0.0018	0.0084
Total Exhaust PM:	0.0106	0.0128	0.0240	0.0157	0.0971	0.2955	0.2965	0.6080	0.0222	0.0645
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0088	0.0080	0.0080	0.0261	0.0040	0.0095
Total PM:	0.0311	0.0333	0.0446	0.0362	0.1185	0.3161	0.3170	0.6467	0.0388	0.0865
SO2:	0.0684	0.0806	0.1158	0.0896	0.1787	0.1129	0.1819	0.4568	0.0326	0.1112
NH3:	0.0996	0.0959	0.0892	0.0942	0.0451	0.0068	0.0068	0.0270	0.0113	0.0890

```
* # # # # # # # # # # # # # # # # # # # # # # # #
* Temperature Test
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # #

                          Calendar Year:  1999
                                  Month:  Jan.
                Gasoline Fuel Sulfur Content:  300. ppm
                  Diesel Fuel Sulfur Content:  500. ppm
                        Particle Size Cutoff: 10.00 Microns
                           Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.5138	0.2687	0.0919		0.0356	0.0015	0.0017	0.0804	0.0064	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0046	0.0060	0.0171	0.0088	0.0904	------	------	------	0.0205	0.0089
ECARBON:	------	------	------	------	------	0.2259	0.1177	0.3860	------	0.0316
OCARBON:	------	------	------	------	------	0.0637	0.1693	0.1900	------	0.0157
SO4:	0.0044	0.0062	0.0064	0.0063	0.0077	0.0059	0.0095	0.0320	0.0009	0.0074
Total Exhaust PM:	0.0090	0.0122	0.0236	0.0151	0.0981	0.2955	0.2965	0.6080	0.0214	0.0635
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0088	0.0080	0.0080	0.0261	0.0040	0.0095
Total PM:	0.0295	0.0327	0.0441	0.0356	0.1195	0.3161	0.3170	0.6467	0.0379	0.0855
SO2:	0.0689	0.0808	0.1159	0.0897	0.1784	0.1129	0.1819	0.4568	0.0329	0.1115

```
              NH3:    0.0996    0.0959    0.0892    0.0942    0.0451    0.0068    0.0068    0.0270    0.0113    0.0890
 ------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* RVP Test
* File 1, Run 1, Scenario 11.
* # # # # # # # # # # # # # # # # # # # # # # # #

                           Calendar Year:  1999
                                   Month:  Jan.
                Gasoline Fuel Sulfur Content:  300. ppm
                  Diesel Fuel Sulfur Content:  500. ppm
                        Particle Size Cutoff: 10.00 Microns
                           Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.5138    0.2687    0.0919              0.0356    0.0015    0.0017    0.0804    0.0064    1.0000
 ------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
              Lead:    0.0000    0.0000    0.0000    0.0000    0.0000    ------    ------    ------    0.0000    0.0000
             GASPM:    0.0046    0.0060    0.0171    0.0088    0.0904    ------    ------    ------    0.0205    0.0089
           ECARBON:    ------    ------    ------    ------    ------    0.2259    0.1177    0.3860    ------    0.0316
           OCARBON:    ------    ------    ------    ------    ------    0.0637    0.1693    0.1900    ------    0.0157
               SO4:    0.0044    0.0062    0.0064    0.0063    0.0077    0.0059    0.0095    0.0320    0.0009    0.0074
  Total Exhaust PM:    0.0090    0.0122    0.0236    0.0151    0.0981    0.2955    0.2965    0.6080    0.0214    0.0635
             Brake:    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
              Tire:    0.0080    0.0080    0.0080    0.0080    0.0088    0.0080    0.0080    0.0261    0.0040    0.0095
          Total PM:    0.0295    0.0327    0.0441    0.0356    0.1195    0.3161    0.3170    0.6467    0.0379    0.0855
               SO2:    0.0689    0.0808    0.1159    0.0897    0.1784    0.1129    0.1819    0.4568    0.0329    0.1115
               NH3:    0.0996    0.0959    0.0892    0.0942    0.0451    0.0068    0.0068    0.0270    0.0113    0.0890
 ------------------------------------------------------------------------------------------------------------------------
```

MOBILE6.1 Calendar Year 2016

```
MOBILE6 INPUT FILE :
>Arizona--Yuma PM10 Exhaust--2016

DAILY OUTPUT       :
AGGREGATED OUTPUT  :
PARTICULATES       :

RUN DATA           :
```

```
>


>SCENARIO: 1, Interstate
SCENARIO RECORD    : Interstate
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 55 Freeway
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 2, Principal Arterials
SCENARIO RECORD    : Principal Arterials
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 42.0 Arterial
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 3, Minor Arterials
SCENARIO RECORD    : Minor Arterials
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 40.0 Arterial
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 4, Rural Major Collectors

SCENARIO RECORD    : Rural Major Collectors
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 45.0 Arterial
```

```
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 5, Rural Minor Collectors

SCENARIO RECORD    : Rural Minor Collectors
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 46.0 Arterial
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 6, Urban Collectors
SCENARIO RECORD    : Urban Collectors
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 35.0 Arterial
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 7, Local Roads
SCENARIO RECORD    : Local Roads
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
VMT BY FACILITY    : FV3.FV
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 8, Interstate Ramps
SCENARIO RECORD    : Interstate Ramps
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
VMT BY FACILITY    : FV4.FV
```

```
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 9, Local
SCENARIO RECORD    : Local
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
VMT BY FACILITY    : FV3.FV
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 7.0

>SCENARIO: 1
SCENARIO RECORD    : Temperature Test
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 55.0 Freeway
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 20. 30.
FUEL RVP           : 7.0

>SCENARIO: 1
SCENARIO RECORD    : RVP Test
CALENDAR YEAR      : 2016
EVALUATION MONTH   : 1
DIESEL SULFUR      : 15.
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
AVERAGE SPEED      : 55.0 Freeway
PARTICLE SIZE      : 10.0
MIN/MAX TEMP       : 64. 92.
FUEL RVP           : 13.0


END OF RUN         :


************************************************************************
* MOBILE6.2.01 (31-Oct-2002)                                           *
* Input file: AZDEQ_16.IN (file 1, run 1).                             *
************************************************************************
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Interstate
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #

                            Calendar Year:  2016
                                    Month:  Jan.
                 Gasoline Fuel Sulfur Content:   30. ppm
                   Diesel Fuel Sulfur Content:   15. ppm
                         Particle Size Cutoff: 10.00 Microns
                             Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3001    0.4252    0.1450              0.0358    0.0003    0.0021    0.0863    0.0052    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
              Lead:    0.0000    0.0000    0.0000    0.0000    0.0000    ------    ------    ------    0.0000    0.0000
             GASPM:    0.0040    0.0038    0.0039    0.0038    0.0185    ------    ------    ------    0.0205    0.0042
           ECARBON:    ------    ------    ------    ------    ------    0.0157    0.0116    0.0441    ------    0.0038
           OCARBON:    ------    ------    ------    ------    ------    0.0044    0.0167    0.0229    ------    0.0020
               SO4:    0.0002    0.0004    0.0004    0.0004    0.0019    0.0002    0.0003    0.0009    0.0001    0.0005
  Total Exhaust PM:    0.0042    0.0042    0.0043    0.0043    0.0204    0.0203    0.0286    0.0680    0.0206    0.0105
             Brake:    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
              Tire:    0.0080    0.0080    0.0080    0.0080    0.0086    0.0080    0.0080    0.0258    0.0040    0.0095
          Total PM:    0.0248    0.0248    0.0249    0.0248    0.0416    0.0408    0.0492    0.1064    0.0371    0.0326
               SO2:    0.0068    0.0088    0.0115    0.0095    0.0164    0.0029    0.0056    0.0132    0.0033    0.0092
               NH3:    0.1017    0.1017    0.1017    0.1017    0.0451    0.0068    0.0068    0.0270    0.0113    0.0925
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Principal Arterials
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #

                            Calendar Year:  2016
                                    Month:  Jan.
                 Gasoline Fuel Sulfur Content:   30. ppm
                   Diesel Fuel Sulfur Content:   15. ppm
                         Particle Size Cutoff: 10.00 Microns
                             Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
```

GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.3001	0.4252	0.1450		0.0358	0.0003	0.0021	0.0863	0.0052	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0040	0.0038	0.0039	0.0038	0.0185	------	------	------	0.0205	0.0042
ECARBON:	------	------	------	------	------	0.0157	0.0116	0.0441	------	0.0038
OCARBON:	------	------	------	------	------	0.0044	0.0167	0.0229	------	0.0020
SO4:	0.0002	0.0004	0.0004	0.0004	0.0019	0.0002	0.0003	0.0009	0.0001	0.0005
Total Exhaust PM:	0.0042	0.0042	0.0043	0.0043	0.0204	0.0203	0.0286	0.0680	0.0206	0.0105
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0086	0.0080	0.0080	0.0258	0.0040	0.0095
Total PM:	0.0248	0.0248	0.0249	0.0248	0.0416	0.0408	0.0492	0.1064	0.0371	0.0326
SO2:	0.0068	0.0088	0.0115	0.0095	0.0164	0.0029	0.0056	0.0132	0.0033	0.0092
NH3:	0.1017	0.1017	0.1017	0.1017	0.0451	0.0068	0.0068	0.0270	0.0113	0.0925

```
* # # # # # # # # # # # # # # # # # # # # # # # #
* Minor Arterials
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # #

                          Calendar Year:  2016
                                 Month:  Jan.
                Gasoline Fuel Sulfur Content:   30. ppm
                  Diesel Fuel Sulfur Content:   15. ppm
                        Particle Size Cutoff: 10.00 Microns
                           Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.3001	0.4252	0.1450		0.0358	0.0003	0.0021	0.0863	0.0052	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0040	0.0038	0.0039	0.0038	0.0185	------	------	------	0.0205	0.0042
ECARBON:	------	------	------	------	------	0.0157	0.0116	0.0441	------	0.0038
OCARBON:	------	------	------	------	------	0.0044	0.0167	0.0229	------	0.0020
SO4:	0.0002	0.0004	0.0004	0.0004	0.0019	0.0002	0.0003	0.0009	0.0001	0.0005
Total Exhaust PM:	0.0042	0.0042	0.0043	0.0043	0.0204	0.0203	0.0286	0.0680	0.0206	0.0105
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0086	0.0080	0.0080	0.0258	0.0040	0.0095
Total PM:	0.0248	0.0248	0.0249	0.0248	0.0416	0.0408	0.0492	0.1064	0.0371	0.0326

```
                SO2:    0.0068    0.0088    0.0115    0.0095    0.0164    0.0029    0.0056    0.0132    0.0033    0.0092
                NH3:    0.1017    0.1017    0.1017    0.1017    0.0451    0.0068    0.0068    0.0270    0.0113    0.0925
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Rural Major Collectors
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # #

                              Calendar Year:  2016
                                     Month:  Jan.
                  Gasoline Fuel Sulfur Content:   30. ppm
                    Diesel Fuel Sulfur Content:   15. ppm
                         Particle Size Cutoff: 10.00 Microns
                             Reformulated Gas:  No

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
                GVWR:                <6000     >6000     (All)
                          ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
    VMT Distribution:    0.3001    0.4252    0.1450              0.0358    0.0003    0.0021    0.0863    0.0052    1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
                Lead:    0.0000    0.0000    0.0000    0.0000    0.0000    ------    ------    ------    0.0000    0.0000
              GASPM:    0.0040    0.0038    0.0039    0.0038    0.0185    ------    ------    ------    0.0205    0.0042
            ECARBON:    ------    ------    ------    ------    ------    0.0157    0.0116    0.0441    ------    0.0038
            OCARBON:    ------    ------    ------    ------    ------    0.0044    0.0167    0.0229    ------    0.0020
                SO4:    0.0002    0.0004    0.0004    0.0004    0.0019    0.0002    0.0003    0.0009    0.0001    0.0005
    Total Exhaust PM:    0.0042    0.0042    0.0043    0.0043    0.0204    0.0203    0.0286    0.0680    0.0206    0.0105
              Brake:    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
               Tire:    0.0080    0.0080    0.0080    0.0080    0.0086    0.0080    0.0080    0.0258    0.0040    0.0095
           Total PM:    0.0248    0.0248    0.0249    0.0248    0.0416    0.0408    0.0492    0.1064    0.0371    0.0326
                SO2:    0.0068    0.0088    0.0115    0.0095    0.0164    0.0029    0.0056    0.0132    0.0033    0.0092
                NH3:    0.1017    0.1017    0.1017    0.1017    0.0451    0.0068    0.0068    0.0270    0.0113    0.0925
 ---------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Rural Minor Collectors
* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # #

                              Calendar Year:  2016
                                     Month:  Jan.
                  Gasoline Fuel Sulfur Content:   30. ppm
                    Diesel Fuel Sulfur Content:   15. ppm
                         Particle Size Cutoff: 10.00 Microns
```

Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.3001	0.4252	0.1450		0.0358	0.0003	0.0021	0.0863	0.0052	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0040	0.0038	0.0039	0.0038	0.0185	------	------	------	0.0205	0.0042
ECARBON:	------	------	------	------	------	0.0157	0.0116	0.0441	------	0.0038
OCARBON:	------	------	------	------	------	0.0044	0.0167	0.0229	------	0.0020
SO4:	0.0002	0.0004	0.0004	0.0004	0.0019	0.0002	0.0003	0.0009	0.0001	0.0005
Total Exhaust PM:	0.0042	0.0042	0.0043	0.0043	0.0204	0.0203	0.0286	0.0680	0.0206	0.0105
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0086	0.0080	0.0080	0.0258	0.0040	0.0095
Total PM:	0.0248	0.0248	0.0249	0.0248	0.0416	0.0408	0.0492	0.1064	0.0371	0.0326
SO2:	0.0068	0.0088	0.0115	0.0095	0.0164	0.0029	0.0056	0.0132	0.0033	0.0092
NH3:	0.1017	0.1017	0.1017	0.1017	0.0451	0.0068	0.0068	0.0270	0.0113	0.0925

```
* # # # # # # # # # # # # # # # # # # # # # # # #
* Urban Collectors
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # #

                          Calendar Year:  2016
                                  Month:  Jan.
                Gasoline Fuel Sulfur Content:   30. ppm
                  Diesel Fuel Sulfur Content:   15. ppm
                        Particle Size Cutoff: 10.00 Microns
                           Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.3001	0.4252	0.1450		0.0358	0.0003	0.0021	0.0863	0.0052	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0040	0.0038	0.0039	0.0038	0.0185	------	------	------	0.0205	0.0042
ECARBON:	------	------	------	------	------	0.0157	0.0116	0.0441	------	0.0038
OCARBON:	------	------	------	------	------	0.0044	0.0167	0.0229	------	0.0020
SO4:	0.0002	0.0004	0.0004	0.0004	0.0019	0.0002	0.0003	0.0009	0.0001	0.0005
Total Exhaust PM:	0.0042	0.0042	0.0043	0.0043	0.0204	0.0203	0.0286	0.0680	0.0206	0.0105

Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0086	0.0080	0.0080	0.0258	0.0040	0.0095
Total PM:	0.0248	0.0248	0.0249	0.0248	0.0416	0.0408	0.0492	0.1064	0.0371	0.0326
SO2:	0.0068	0.0088	0.0115	0.0095	0.0164	0.0029	0.0056	0.0132	0.0033	0.0092
NH3:	0.1017	0.1017	0.1017	0.1017	0.0451	0.0068	0.0068	0.0270	0.0113	0.0925

```
* # # # # # # # # # # # # # # # # # # # # # # # #
* Local Roads
* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # #

                           Calendar Year:  2016
                                   Month:  Jan.
                 Gasoline Fuel Sulfur Content:   30. ppm
                   Diesel Fuel Sulfur Content:   15. ppm
                         Particle Size Cutoff: 10.00 Microns
                             Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.3001	0.4252	0.1450		0.0358	0.0003	0.0021	0.0863	0.0052	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0037	0.0037	0.0038	0.0037	0.0190	------	------	------	0.0205	0.0040
ECARBON:	------	------	------	------	------	0.0157	0.0116	0.0441	------	0.0038
OCARBON:	------	------	------	------	------	0.0044	0.0167	0.0229	------	0.0020
SO4:	0.0005	0.0006	0.0006	0.0006	0.0013	0.0002	0.0003	0.0009	0.0002	0.0006
Total Exhaust PM:	0.0043	0.0043	0.0044	0.0043	0.0203	0.0203	0.0286	0.0680	0.0207	0.0105
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0086	0.0080	0.0080	0.0258	0.0040	0.0095
Total PM:	0.0248	0.0248	0.0249	0.0248	0.0415	0.0408	0.0492	0.1064	0.0372	0.0326
SO2:	0.0067	0.0088	0.0115	0.0095	0.0166	0.0029	0.0056	0.0132	0.0033	0.0092
NH3:	0.1017	0.1017	0.1017	0.1017	0.0451	0.0068	0.0068	0.0270	0.0113	0.0925

```
* # # # # # # # # # # # # # # # # # # # # # # # #
* Interstate Ramps
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # #

                           Calendar Year:  2016
                                   Month:  Jan.
```

```
              Gasoline Fuel Sulfur Content:   30. ppm
                Diesel Fuel Sulfur Content:   15. ppm
                      Particle Size Cutoff: 10.00 Microns
                          Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3001    0.4252    0.1450              0.0358    0.0003    0.0021    0.0863    0.0052    1.0000
 -------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
              Lead:    0.0000    0.0000    0.0000    0.0000    0.0000    ------    ------    ------    0.0000    0.0000
             GASPM:    0.0040    0.0038    0.0039    0.0038    0.0185    ------    ------    ------    0.0205    0.0041
           ECARBON:    ------    ------    ------    ------    ------    0.0157    0.0116    0.0441    ------    0.0038
           OCARBON:    ------    ------    ------    ------    ------    0.0044    0.0167    0.0229    ------    0.0020
               SO4:    0.0002    0.0004    0.0004    0.0004    0.0019    0.0002    0.0003    0.0009    0.0001    0.0005
  Total Exhaust PM:    0.0042    0.0042    0.0043    0.0043    0.0204    0.0203    0.0286    0.0680    0.0206    0.0105
             Brake:    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
              Tire:    0.0080    0.0080    0.0080    0.0080    0.0086    0.0080    0.0080    0.0258    0.0040    0.0095
          Total PM:    0.0248    0.0248    0.0249    0.0248    0.0416    0.0408    0.0492    0.1064    0.0371    0.0326
               SO2:    0.0068    0.0088    0.0115    0.0095    0.0164    0.0029    0.0056    0.0132    0.0033    0.0092
               NH3:    0.1017    0.1017    0.1017    0.1017    0.0451    0.0068    0.0068    0.0270    0.0113    0.0925
 -------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Local
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # #

                           Calendar Year:  2016
                                   Month:  Jan.
              Gasoline Fuel Sulfur Content:   30. ppm
                Diesel Fuel Sulfur Content:   15. ppm
                      Particle Size Cutoff: 10.00 Microns
                          Reformulated Gas:  No

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3001    0.4252    0.1450              0.0358    0.0003    0.0021    0.0863    0.0052    1.0000
 -------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
              Lead:    0.0000    0.0000    0.0000    0.0000    0.0000    ------    ------    ------    0.0000    0.0000
             GASPM:    0.0037    0.0037    0.0038    0.0037    0.0190    ------    ------    ------    0.0205    0.0040
           ECARBON:    ------    ------    ------    ------    ------    0.0157    0.0116    0.0441    ------    0.0038
```

OCARBON:	------	------	------	------	------	0.0044	0.0167	0.0229	------	0.0020
SO4:	0.0005	0.0006	0.0006	0.0006	0.0013	0.0002	0.0003	0.0009	0.0002	0.0006
Total Exhaust PM:	0.0043	0.0043	0.0044	0.0043	0.0203	0.0203	0.0286	0.0680	0.0207	0.0105
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0086	0.0080	0.0080	0.0258	0.0040	0.0095
Total PM:	0.0248	0.0248	0.0249	0.0248	0.0415	0.0408	0.0492	0.1064	0.0372	0.0326
SO2:	0.0067	0.0088	0.0115	0.0095	0.0166	0.0029	0.0056	0.0132	0.0033	0.0092
NH3:	0.1017	0.1017	0.1017	0.1017	0.0451	0.0068	0.0068	0.0270	0.0113	0.0925

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Temperature Test
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # # #

                          Calendar Year:  2016
                                 Month:  Jan.
                Gasoline Fuel Sulfur Content:   30. ppm
                  Diesel Fuel Sulfur Content:   15. ppm
                        Particle Size Cutoff: 10.00 Microns
                           Reformulated Gas:  No
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
	------	------	------	------	------	------	------	------	------	------
VMT Distribution:	0.3001	0.4252	0.1450		0.0358	0.0003	0.0021	0.0863	0.0052	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0040	0.0038	0.0039	0.0038	0.0185	------	------	------	0.0205	0.0042
ECARBON:	------	------	------	------	------	0.0157	0.0116	0.0441	------	0.0038
OCARBON:	------	------	------	------	------	0.0044	0.0167	0.0229	------	0.0020
SO4:	0.0002	0.0004	0.0004	0.0004	0.0019	0.0002	0.0003	0.0009	0.0001	0.0005
Total Exhaust PM:	0.0042	0.0042	0.0043	0.0043	0.0204	0.0203	0.0286	0.0680	0.0206	0.0105
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0086	0.0080	0.0080	0.0258	0.0040	0.0095
Total PM:	0.0248	0.0248	0.0249	0.0248	0.0416	0.0408	0.0492	0.1064	0.0371	0.0326
SO2:	0.0068	0.0088	0.0115	0.0095	0.0164	0.0029	0.0056	0.0132	0.0033	0.0092
NH3:	0.1017	0.1017	0.1017	0.1017	0.0451	0.0068	0.0068	0.0270	0.0113	0.0925

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* RVP Test
* File 1, Run 1, Scenario 11.
* # # # # # # # # # # # # # # # # # # # # # # # # #
```

Calendar Year: 2016
Month: Jan.
Gasoline Fuel Sulfur Content: 30. ppm
Diesel Fuel Sulfur Content: 15. ppm
Particle Size Cutoff: 10.00 Microns
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.3001	0.4252	0.1450		0.0358	0.0003	0.0021	0.0863	0.0052	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0040	0.0038	0.0039	0.0038	0.0185	------	------	------	0.0205	0.0042
ECARBON:	------	------	------	------	------	0.0157	0.0116	0.0441	------	0.0038
OCARBON:	------	------	------	------	------	0.0044	0.0167	0.0229	------	0.0020
SO4:	0.0002	0.0004	0.0004	0.0004	0.0019	0.0002	0.0003	0.0009	0.0001	0.0005
Total Exhaust PM:	0.0042	0.0042	0.0043	0.0043	0.0204	0.0203	0.0286	0.0680	0.0206	0.0105
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0086	0.0080	0.0080	0.0258	0.0040	0.0095
Total PM:	0.0248	0.0248	0.0249	0.0248	0.0416	0.0408	0.0492	0.1064	0.0371	0.0326
SO2:	0.0068	0.0088	0.0115	0.0095	0.0164	0.0029	0.0056	0.0132	0.0033	0.0092
NH3:	0.1017	0.1017	0.1017	0.1017	0.0451	0.0068	0.0068	0.0270	0.0113	0.0925